



PCTEST ENGINEERING LABORATORY, INC.

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SAR COMPLIANCE EVALUATION REPORT

Applicant Name:
Samsung Electronics, Co. Ltd.
18600 Broadwick St.
Rancho Dominguez, CA 90220
United States

Date of Testing:
06/15/10 - 06/24/10
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Test Report Serial No.:
0Y1006171059-R7.A3L

FCC ID: A3LSPHD700

APPLICANT: SAMSUNG ELECTRONICS, CO. LTD.

EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN
Application Type: Certification
FCC Rule Part(s): CFR §2.1093; FCC/OET Bulletin 65 Supplement C [June 2001]
FCC Classification: Licensed Transmitter Held to Ear (PCE)
Digital Transmission System (DTS)
Model(s): SPH-D700
Tx Frequency: 824.70 - 848.31 MHz (Cellular CDMA)
1851.25 - 1908.75 MHz (PCS CDMA)
2500 - 2700 Mhz (WIMAX)
2412 - 2462 MHz (WLAN)
Conducted Power: 24.83 dBm Cell. CDMA / 25.14 dBm PCS CDMA
25.29 dBm 2.6 GHz WIMAX / 12.89 dBm 2.4 GHz WLAN
Max. SAR Measurement: 0.68 W/kg Cell. CDMA Head SAR
0.99 W/kg Cell. CDMA Body SAR
0.44 W/kg PCS CDMA Head SAR
0.77 W/kg PCS CDMA Body SAR
0.26 W/kg 2.6 GHz WIMAX Body SAR (Scaled)
0.32 W/kg 2.4 GHz WLAN Head SAR
0.09 W/kg 2.4 GHz WLAN Body SAR
Test Device Serial No.: Pre-Production [S/N: 76]

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in FCC/OET Bulletin 65 Supplement C (2001), IEEE 1528-2003 and in applicable Industry Canada Radio Standards Specifications (RSS); for North American frequency bands only.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Test results reported herein relate only to the item(s) tested.

PCTEST certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.



Randy Ortanez
President



FCC ID: A3LSPHD700		SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: 0Y1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 1 of 52

T A B L E O F C O N T E N T S

1	INTRODUCTION	3
2	TEST SITE LOCATION	4
3	SAR MEASUREMENT SETUP	5
4	DASY E-FIELD PROBE SYSTEM	7
5	PROBE CALIBRATION PROCESS	8
6	PHANTOM AND EQUIVALENT TISSUES.....	9
7	DOSIMETRIC ASSESSMENT & PHANTOM SPECS.....	10
8	DEFINITION OF REFERENCE POINTS	11
9	TEST CONFIGURATION POSITIONS	12
10	RF EXPOSURE LIMITS	16
11	MEASUREMENT UNCERTAINTIES	17
12	SYSTEM VERIFICATION.....	18
13	FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS.....	21
14	SIMULTANEOUS TX CONSIDERATIONS.....	22
15	4G WIMAX LINEARITY & SAR CONSIDERATIONS.....	23
16	FCC 3G MEASUREMENT PROCEDURES.....	34
17	RF CONDUCTED POWERS.....	36
18	SAR DATA SUMMARY	38
19	EQUIPMENT LIST.....	45
20	CONCLUSION.....	46
21	REFERENCES	47
22	SAR TEST SETUP PHOTOGRAPHS.....	49

FCC ID: A3LSPHD700	 PCTEST <small>ENGINEERING LABORATORY, INC.</small>	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 2 of 52

1 INTRODUCTION

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices.[1]

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz[2] and Health Canada RF Exposure Guidelines Safety Code 6 [26]. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave [3] is used for guidance in measuring the Specific Absorption Rate (SAR) due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the International Committee for Non-Ionizing Radiation Protection (ICNIRP) in "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," Report No. Vol 74. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

1.1 SAR Definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Fig. 1-1).

$$SAR = \frac{d}{dt} \left(\frac{dU}{dm} \right) = \frac{d}{dt} \left(\frac{dU}{\rho dv} \right)$$

Figure 1-1
SAR Mathematical Equation



SAR is expressed in units of Watts per Kilogram (W/kg).

$$SAR = \frac{\sigma \cdot E^2}{\rho}$$

where:

- σ = conductivity of the tissue-simulating material (S/m)
- ρ = mass density of the tissue-simulating material (kg/m^3)
- E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relation to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.[6]

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: 0Y1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 3 of 52

2 TEST SITE LOCATION

2.1 INTRODUCTION

The map at the right shows the location of the PCTEST LABORATORY in Columbia, Maryland. It is in proximity to the FCC Laboratory, the Baltimore-Washington International (BWI) airport, the city of Baltimore and Washington, DC (See Figure 2).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49' 38" W longitude. The facility is 1.5 miles north of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4 on January 27, 2006 and Industry Canada.

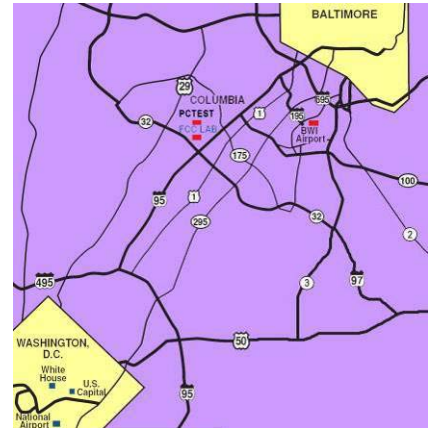


Table 2-1
Map of the Greater Baltimore and Metropolitan Washington, D.C. area

2.2 Test Facility / Accreditations:

Measurements were performed at an independent accredited PCTEST Engineering Lab located in Columbia, MD 21045, U.S.A.



- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing-Aid Compatibility (HAC), CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (IC-2451).
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and all Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (IC-2451) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS and CDMA, and EvDO mobile phones.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO Data, CDMA 1xRTT Data

FCC ID: A3LSPHD700	PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT	SAMSUNG	Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN	Page 4 of 52	

3 SAR MEASUREMENT SETUP

3.1 Robotic System

Measurements are performed using the DASY4 automated dosimetric assessment system. The DASY4 is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland and consists of high precision robotics system (Staubli), robot controller, Pentium 4 computer, near-field probe, probe alignment sensor, and the generic twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Figure 3-1).

3.2 System Hardware

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and a remote control used to drive the robot motors. The PC consists of the Gateway Pentium 4 2.53 GHz computer with Windows XP system and SAR Measurement Software DASY4, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit that performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

3.3 System Electronics

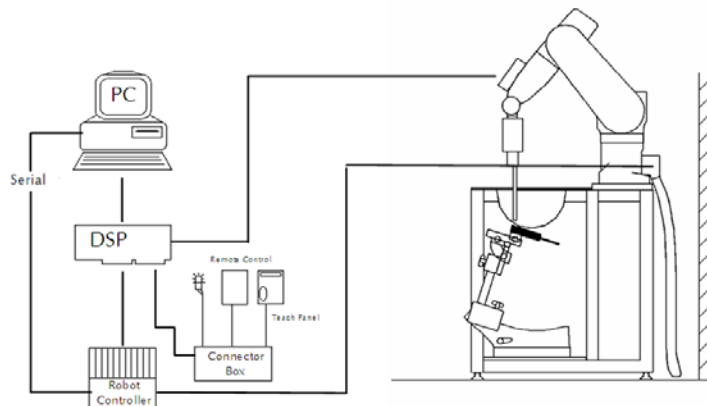




Table 3-1
SAR Measurement System Setup

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in [7].

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: 0Y1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 5 of 52

3.4 Automated Test System Specifications

Positioner

Robot: Stäubli Unimation Corp. Robot RX60L
 Repeatability: 0.02 mm
 No. of Axes: 6

Data Acquisition Electronic System (DAE)

Cell Controller

Processor: Pentium 4
 Clock Speed: 2.53 GHz
 Operating System: Windows XP Professional

Data Converter

Features: Signal Amplifier, multiplexer, A/D converter & control logic
 Software: DASY4, SEMCAD software
 Connecting Lines: Optical Downlink for data and status info
 Optical upload for commands and clock

PC Interface Card



Function: 166MHz low power Pentium MMX 32MB chipdisk
 Link to DAE
 16-bit A/D converter for surface detection system
 Two Serial & Ethernet link to robotics
 Direct emergency stop output for robot

Phantom

Type: SAM Twin Phantom (V4.0)
 Shell Material: Composite
 Thickness: 2.0 ± 0.2 mm



**Table 3-2
 DASY4 SAR Measurement System**

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: 0Y1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 6 of 52

4.1 Probe Measurement System



Table 4-1
SAR System

The SAR measurements were conducted with the dosimetric probe EX3DV4, designed in the classical triangular configuration [7] (see Table 4-3) and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multi-fiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 software reads the reflection during a software approach

and looks for the maximum using a 2nd order fitting (see Figure 5-1). The approach is stopped at reaching the maximum.

4.2 Probe Specifications



Model:	ES3DV3, EX3DV4
Frequency Range:	10 MHz – 6.0 GHz (EX3DV4) 10 MHz – 4 GHz (ES3DV3)
Calibration:	In brain and muscle simulating tissue at Frequencies from 835 up to 5800MHz
Linearity:	± 0.2 dB (30 MHz to 6 GHz) for EX3DV4 ± 0.2 dB (30 MHz to 4 GHz) for ES3DV3
Dynamic Range:	10 mW/kg – 100 W/kg
Probe Length:	330 mm
Probe Tip Length:	20 mm
Body Diameter:	12 mm
Tip Diameter:	2.5 mm (3.9mm for ES3DV3)
Tip-Center:	1 mm (2.0 mm for ES3DV3)
Application:	SAR Dosimetry Testing Compliance tests of mobile phones Dosimetry in strong gradient fields



Table 4-2
Near-Field Probe



Table 4-3
Triangular Probe
Configuration

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 7 of 52

5 PROBE CALIBRATION PROCESS

5.1 Dosimetric Assessment Procedure

Each E-Probe/Probe amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm²) using an RF Signal generator, TEM cell, and RF Power Meter.

5.2 Free Space Assessment

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mW/cm².

5.3 Temperature Assessment

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C \frac{\Delta T}{\Delta t}$$

where:

- Δt = exposure time (30 seconds),
- C = heat capacity of tissue (brain or muscle),
- ΔT = temperature increase due to RF exposure.

$$SAR = \frac{|E|^2 \cdot \sigma}{\rho}$$

where:

- σ = simulated tissue conductivity,
- ρ = Tissue density (1.25 g/cm³ for brain tissue)

SAR is proportional to $\Delta T/\Delta t$, the initial rate of tissue heating, before thermal diffusion takes place. Now it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E- field;

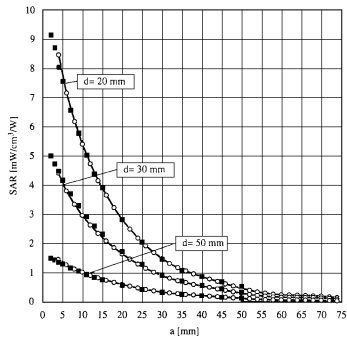


Table 5-1 E-Field and Temperature measurements at 900MHz [7]

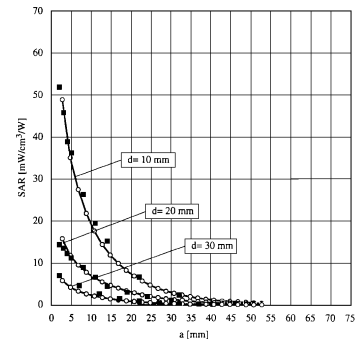


Table 5-2 E-Field and temperature measurements at 1.9GHz [7]

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Filename: 0Y1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 8 of 52

6

PHANTOM AND EQUIVALENT TISSUES

6.1 SAM Phantoms



**Figure 6-1
SAM Phantoms**

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users [11][12]. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. (see Fig. 5.1)

6.2 Brain & Muscle Simulating Mixture Characterization



**Figure 6-2
Head Simulated**

The brain and muscle mixtures consist of a viscous gel using hydroxethylcellulose (HEC) gelling agent and saline solution (see Table 6-1). Preservation with a bactericide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 have been incorporated in the following table. Other head and body tissue parameters that have not been specified in IEEE-1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations. The mixture characterizations used for the brain and muscle tissue simulating liquids are according to the data by C. Gabriel and G. Hartsgrove [13]. (See Table 6-1)

Table 6-1
Composition of the Head & Body Tissue Equivalent Matter

Frequency (MHz)	835	835	1900	1900	2400-2700	2400-2700
Tissue	Head	Body	Head	Body	Head	Body
Ingredients (% by weight)						
Bactericide	0.1	0.1			0.5	
Diacetin					49.75	
DGBE			44.92	29.44		30
HEC	1	1				
NaCl	1.45	0.94	0.18	0.39		
Sucrose	57	44.9				
Water	40.45	53.06	54.9	70.16	49.75	70

FCC ID: A3LSPHD700	PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 9 of 52

7 DOSIMETRIC ASSESSMENT & PHANTOM SPECS

7.1 Measurement Procedure

The evaluation was performed using the following procedure:



1. The SAR measurement was taken at a selected spatial reference point to monitor power variations during testing. This fixed point was measured and used as a reference value.
2. The SAR distribution at the exposed side of the head was measured at a distance of 3.0mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15mm x 15mm.
3. Based on the area scan data, the area of the maximum absorption was determined by spline interpolation. Around this point, a volume of 32mm x 32mm x 30mm (fine resolution volume scan, zoom scan) was assessed by measuring 5 x 5 x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see Figure 7-1):
 - a. The data at the surface was extrapolated, since the center of the dipoles is 2.7mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. The extrapolation was based on a least square algorithm [15]. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.
 - b. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions) [15][16]. The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.
 - c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 1, was re-measured. If the value changed by more than 5%, the evaluation is repeated.

7.2 Specific Anthropomorphic Mannequin (SAM) Specifications

The phantom for handset SAR assessment testing is a low-loss dielectric shell, with shape and dimensions derived from the anthropometric data of the 90th percentile adult male head dimensions as tabulated by the US Army. The SAM Twin Phantom shell is bisected along the mid-sagittal plane into right and left halves (see Figure 7-2). The perimeter sidewalls of each phantom halves are extended to allow filling with liquid to a depth that is sufficient to minimized reflections from the upper surface. The liquid depth is maintained at a minimum depth of 15cm to minimize reflections from the upper surface.



**Table 7-1
SAM Twin Phantom Shell**

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN	Page 10 of 52	

8.1 EAR REFERENCE POINT

Figure 8-1 shows the front, back and side views of the SAM Twin Phantom. The point "M" is the reference point for the center of the mouth, "LE" is the left ear reference point (ERP), and "RE" is the right ERP. The ERP is 15mm posterior to the entrance to the ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 8-1. The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front) is perpendicular to the reference plane and passing through the RE (or LE) is called the Reference Pivoting Line (see Figure 8-2). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning [5].

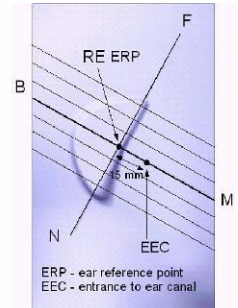


Table 8-1
Close-Up Side view
of ERP

8.2 HANDSET REFERENCE POINTS

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The test device was placed in a normal operating position with the "test device reference point" located along the "vertical centerline" on the front of the device aligned to the "ear reference point" (See Figure 8-3). The "test device reference point" was then located at the same level as the center of the ear reference point. The test device was positioned so that the "vertical centerline" was bisecting the front surface of the handset at its top and bottom edges, positioning the "ear reference point" on the outer surface of the both the left and right head phantoms on the ear reference point.



Table 8-2
Front, back and side view of SAM Twin Phantom

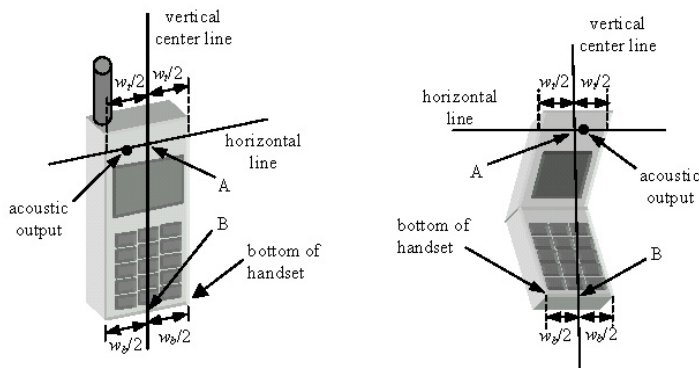




Table 8-3
Handset Vertical Center & Horizontal Line Reference Points

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 11 of 52

9

TEST CONFIGURATION POSITIONS

9.1 Positioning for Cheek/Touch

1. The test device was positioned with the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 9-1), such that the plane defined by the vertical center line and the horizontal line of the phone is approximately parallel to the sagittal plane of the phantom.

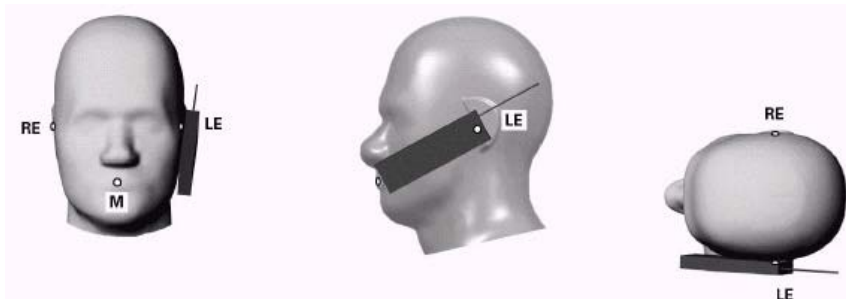




Table 9-1 Front, Side and Top View of Cheek/Touch Position

2. The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the ear.
3. While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the plane normal to MB-NF including the line MB (reference plane).
4. The phone was then rotated around the vertical centerline until the phone (horizontal line) was symmetrical with respect to the line NF.
5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the phone contact with the ear, the handset was rotated about the line NF until any point on the handset made contact with a phantom point below the ear (cheek). See Figure 9-2)

9.2 Positioning for Ear / 15° Tilt

With the test device aligned in the “Cheek/Touch Position”:

1. While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15 degree.
2. The phone was then rotated around the horizontal line by 15 degree.
3. While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the phone touches the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. The tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head (see Figure 9-3).

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 12 of 52

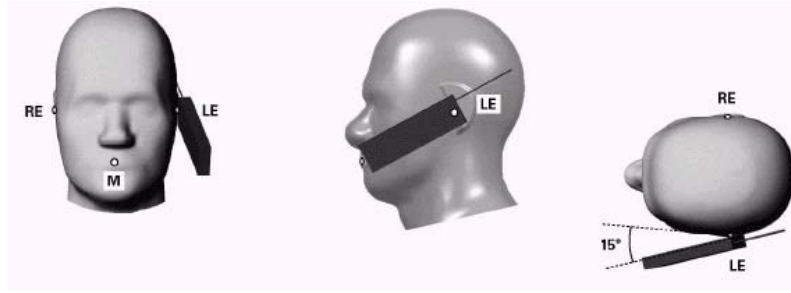


Table 9-2 Front, Side and Top View of Ear/15° Tilt Position

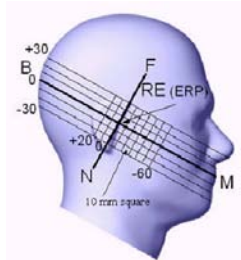


Table 9-3 Side view w/ relevant markings



Table 9-4 Body SAR Sample Photo (Not Actual EUT)

9.3 SAR Evaluations near the Mouth/Jaw Regions of the SAM Phantom

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones. It has been known for some time that there are SAR measurement difficulties in these regions of the SAM phantom. SAR probes are calibrated in tissue equivalent liquids with sufficient separation between the probe sensors and nearby physical boundaries to ensure scattering does not affect probe calibration. When the probe tip is moved into tight regions with multiple boundaries surrounding its sensors, probe calibration and measurement accuracy can become questionable. In addition, these measurement locations often require a probe to be tilted at steep angles, where it may no longer comply with calibration requirements and measurement protocols, or satisfy the required measurement uncertainty. In some situations it is not feasible to tilt the probe or rotate the phantom, as suggested by measurement standards, to conduct these measurements.

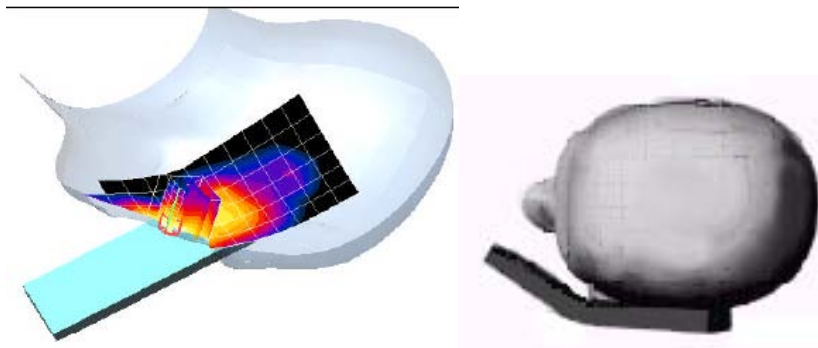


Table 9-5 SAR Scans near the Jaw/Mouth

In order to ensure there is sufficient conservativeness for ensuring compliance until practical solutions are available, additional measurement considerations are necessary to address these technical difficulties. When measurements are required near the mouth, nose, jaw or similar tight regions of the SAM phantom,

FCC ID: A3LSPHD700	PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT	SAMSUNG	Reviewed by: Quality Manager
Filename: 0Y1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 13 of 52

area or zoom scans are often unable to fully enclose the peak SAR location as required by IEEE 1528 and Supplement C, due to probe orientation and positioning difficulties. Even when limited measurements are possible, the test results could be questionable due to probe calibration and measurement uncertainty issues. Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document publication 648474. The SAR required in these regions of SAM should be measured using a flat phantom. **Rectangular shaped phones** should be positioned with its bottom edge positioned from the flat phantom with the same distance provided by the cheek touching position using SAM. The ear reference point (ERP, as defined for SAM) of the phone should be positioned ½ cm from the flat phantom shell. **Clam-shell phones** should be positioned with the hinge against a smooth edge of the flat phantom where the upper half of the phone is unfolded and extended beyond the phantom side wall. The lower half of the phone is secured in the test device holder at a fixed distance below the flat phantom determined by the minimum separation along the lower edge of the phone in the cheek touching position using SAM. Any case with substantial variation in separation distance along the lower edge of a clam shell is discussed with the FCC for best-to-use methodology.

The flat phantom data should allow test results to be compared uniformly across measurement systems, until suitable solutions are available in measurement standards to address certain probe calibration and positioning issues, due to implementation differences between horizontal and upright SAM configurations. These flat phantom procedures are only applicable for stand-alone SAR evaluation in tight regions of the SAM phantom, where measurement is not feasible or test results can be questionable due to probe calibration and accessibility issues. Details on device positioning and photos showing how separation distances are determined are included in the SAR report Photographs. SAR for other regions of the head must be evaluated using SAM; therefore, a phone with antennas at different locations may require flat and SAM phantom evaluation for the different antennas.

9.4 Body Holster /Belt Clip Configurations



Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 9-5). A device with a headset output is tested with a headset connected to the device.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in brain fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

9.5 SAR Testing with IEEE 802.11 a/b/g Transmitters (if applicable)

Normal network operating configurations are not suitable for measuring the SAR of 802.11 a/b/g transmitters. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 14 of 52

undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable.

9.5.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.



9.5.2 Frequency Channel Configurations²²

802.11 a/b/g and 4.9 GHz operating modes are tested independently according to the service requirements in each frequency band. 802.11 b/g modes are tested on channels 1, 6 and 11. 802.11a is tested for UNII operations on channels 36 and 48 in the 5.15-5.25 GHz band; channels 52 and 64 in the 5.25-5.35 GHz band; channels 104, 116, 124 and 136 in the 5.470-5.725 GHz band; and channels 149 and 161 in the 5.8 GHz band. When 5.8 GHz §15.247 is also available, channels 149, 157 and 165 should be tested instead of the UNII channels. 4.9 GHz is tested on channels 1, 10 and 5 or 6, whichever has the higher output power, for 5 MHz channels; channels 11, 15 and 19 for 10 MHz channels; and channels 21 and 25 for 20 MHz channels. These are referred to as the “default test channels”. 802.11g mode was evaluated only if the output power was 0.25 dB higher than the 802.11b mode.

**Table 9-6
802.11 Test Channels per FCC Requirements**

Mode	GHz	Channel	Turbo Channel	“Default Test Channels”			
				§15.247	UNII		
				802.11b	802.11g		
802.11 b/g	2.412	1		√	∇		
	2.437	6	6	√	∇		
	2.462	11		√	∇		
802.11a	5.18	36				√	
	5.20	40	42 (5.21 GHz)			*	
	5.22	44				*	
	5.24	48				√	
	5.26	52	50 (5.25 GHz)			√	
	5.28	56				*	
	5.30	60	58 (5.29 GHz)			*	
	5.32	64				√	
		5.500	100	Unknown			*
		5.520	104				√
		5.540	108				*
		5.560	112				*
		5.580	116				√
		5.600	120				*
		5.620	124				√
		5.640	128				*
		5.660	132				*
		5.680	136				√
		5.700	140			*	
		5.745	149		√		√
	5.765	153	152 (5.76 GHz)		*	*	
	5.785	157		√		*	
	5.805	161	160 (5.80 GHz)		*	√	
§15.247	5.825	165		√			

FCC ID: A3LSPHD700	PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 15 of 52

10 RF EXPOSURE LIMITS

10.1 Uncontrolled Environment

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.



10.2 Controlled Environment

CONTROLLED ENVIRONMENTS are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Table 10-1
SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT <i>General Population</i> (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT <i>Occupational</i> (W/kg) or (mW/g)
SPATIAL PEAK SAR Brain	1.6	8.0
SPATIAL AVERAGE SAR Whole Body	0.08	0.4
SPATIAL PEAK SAR Hands, Feet, Ankles, Wrists	4.0	20

- 1 The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
- 2 The Spatial Average value of the SAR averaged over the whole body.
- 3 The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.



FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 16 of 52

11 MEASUREMENT UNCERTAINTIES

Applicable for 835 - 2700 MHz.

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	IEEE 1528 Sec.	Tol. (± %)	Prob. Dist.	Div.	c _i 1gm	c _i 10 gms	1gm u _i (± %)	10gms u _i (± %)	v _i
Measurement System (DASY4, V4.7)									
Probe Calibration	E.2.1	5.5	N	1	1.0	1.0	5.5	5.5	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	1.0	1.0	1.3	1.3	∞
Boundary Effect	E.2.3	0.4	N	1	1.0	1.0	0.4	0.4	∞
Linearity	E.2.4	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	E.2.5	5.1	N	1	1.0	1.0	5.1	5.1	∞
Readout Electronics	E.2.6	1.0	N	1	1.0	1.0	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	E.6.3	2.9	R	1.73	1.0	1.0	1.7	1.7	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	1.0	R	1.73	1.0	1.0	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	6.0	N	1	1.0	1.0	6.0	6.0	287
Device Holder Uncertainty	E.4.1	3.32	R	1.73	1.0	1.0	1.9	1.9	∞
Output Power Variation - SAR drift measurement	6.6.2	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	3.8	N	1	0.64	0.43	2.4	1.6	6
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Liquid Permittivity - measurement uncertainty	E.3.3	4.5	N	1	0.60	0.49	2.7	2.2	6
Combined Standard Uncertainty (k=1)				RSS			11.8	11.5	299
Expanded Uncertainty (95% CONFIDENCE LEVEL)				k=2			23.7	23.0	

The above measurement uncertainties are according to IEEE Std. 1528-2003

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 17 of 52

12 SYSTEM VERIFICATION



12.1 Tissue Verification

**Table 12-1
Measured Tissue Properties**

Calibrated Date:	Tissue Type	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
06/14/2010	835H	820	0.879	41.72	0.898	41.571	-2.12%	0.36%
		835	0.885	41.62	0.900	41.500	-1.67%	0.29%
		850	0.900	41.48	0.916	41.500	-1.75%	-0.05%
06/14/2010	835M	820	0.977	53.60	0.969	55.284	0.83%	-3.05%
		835	0.980	53.48	0.970	55.200	1.03%	-3.12%
		850	0.994	53.39	0.988	55.154	0.61%	-3.20%
06/14/2010	1900H	1850	1.411	40.30	1.400	40.000	0.79%	0.75%
		1880	1.440	40.12	1.400	40.000	2.86%	0.30%
		1910	1.467	40.03	1.400	40.000	4.79%	0.08%
06/14/2010	1900M	1850	1.502	51.25	1.520	53.300	-1.18%	-3.85%
		1880	1.536	51.15	1.520	53.300	1.05%	-4.03%
		1910	1.573	51.04	1.520	53.300	3.49%	-4.24%
06/14/2010	2450H	2401	1.702	38.33	1.758	39.298	-3.19%	-2.46%
		2450	1.756	38.05	1.800	39.200	-2.44%	-2.93%
		2499	1.806	37.88	1.852	39.135	-2.48%	-3.21%
06/14/2010	2450M	2401	1.875	51.15	1.903	52.765	-1.47%	-3.06%
		2450	1.944	51.00	1.950	52.700	-0.31%	-3.23%
		2499	2.009	50.79	2.019	52.638	-0.50%	-3.51%
06/21/2010	2450H	2401	1.697	38.42	1.758	39.298	-3.47%	-2.23%
		2450	1.737	38.12	1.800	39.200	-3.50%	-2.76%
		2499	1.796	37.90	1.852	39.135	-3.02%	-3.16%
06/21/2010	2450M	2401	1.885	51.25	1.903	52.765	-0.95%	-2.87%
		2450	1.946	51.06	1.950	52.700	-0.21%	-3.11%
		2499	2.008	50.90	2.019	52.638	-0.54%	-3.30%
06/14/2010	2600M	2500	1.960	51.62	2.021	52.636	-3.00%	-1.94%
		2600	2.132	51.30	2.163	52.509	-1.42%	-2.30%
		2650	2.194	51.13	2.234	52.445	-1.77%	-2.51%
		2700	2.254	50.98	2.305	52.382	-2.19%	-2.68%
07/19/2010	2600H	2500	1.897	39.40	1.853	39.133	2.37%	0.68%
		2550	1.924	39.29	1.907	39.067	0.89%	0.57%
		2600	2.036	38.93	2.015	38.938	1.04%	-0.02%
		2650	2.120	38.60	2.070	38.875	2.39%	-0.71%
		2700	1.960	51.62	2.021	52.636	-3.00%	-1.94%

Note: KDB 450824 was ensured to be applied for probe calibration frequencies greater than or equal to 50 MHz of the DUT frequencies.

The above measured tissue parameters were used in the DASY software to perform interpolation via the DASY software to determine actual dielectric parameters at the test frequencies (per IEEE 1528 6.6.1.2). The SAR test plots may slightly differ from the table above since the DASY software rounds to three significant digits.



FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 18 of 52

12.2 Measurement Procedure for Tissue verification

- 1) The network analyzer and probe system was configured and calibrated.
- 2) The probe was immersed in the sample which was placed in a nonmetallic container. Trapped air bubbles beneath the flange were minimized by placing the probe at a slight angle.
- 3) The complex admittance with respect to the probe aperture was measured
- 4) The complex relative permittivity , for example from the below equation (Pournaropoulos and Misra):

$$Y = \frac{j2\omega\epsilon_r\epsilon_0}{[\ln(b/a)]^2} \int_a^b \int_a^b \int_0^\pi \cos\phi' \frac{\exp[-j\omega r(\mu_0\epsilon_r'\epsilon_0)^{1/2}]}{r} d\phi' d\rho' d\rho$$

where Y is the admittance of the probe in contact with the sample, the primed and unprimed coordinates refer to source and observation points, respectively, $r^2 = \rho^2 + \rho'^2 - 2\rho\rho' \cos\phi'$, ω is the angular frequency, and $j = \sqrt{-1}$.

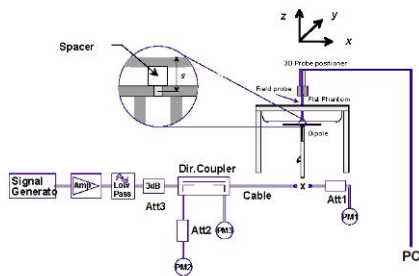
FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 19 of 52

12.3 Test System Verification

Prior to assessment, the system is verified to $\pm 10\%$ of the manufacturer SAR measurement on the reference dipole at the time of calibration.

**Table 12-2
System Verification Results**

System Verification TARGET & MEASURED										
Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Tissue Frequency (MHz)	Dipole SN	Tissue Type	Measured SAR _{1g} (W/kg)	1W Target SAR _{1g} (W/kg)	1W Normalized SAR _{1g} (W/kg)	Deviation (%)
06/15/2010	23.5	21.8	0.0500	1900	502	Head	2.02	39.90	40.40	1.25%
06/15/2010	22.6	21.5	0.0630	835	4d047	Head	0.651	9.70	10.33	6.53%
06/16/2010	22.7	21.5	0.0250	2450	719	Head	1.35	53.50	54.00	0.93%
06/18/2010	22.8	22	0.0316	2600	1004	Body	1.74	55.60	55.06	-0.97%
06/21/2010	22.5	20.9	0.0646	835	4d047	Body	0.691	9.82	10.70	8.93%
06/24/2010	23.3	21.6	0.0250	2450	719	Head	1.33	53.50	53.20	-0.56%
07/19/2010	24.7	22.9	0.010	2600	1004	Head	0.54	56.60	54.00	-4.59%



**Table 12-3
System Verification Setup Diagram**



**Table 12-4
System Verification Setup Photo**

FCC ID: A3LSPHD700	PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 20 of 52

13 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

13.1 Introduction

The following procedures adopted from “FCC SAR Considerations for Cell Phones with Multiple Transmitters” v01r03 from May 2008 are applicable to handsets with built-in unlicensed transmitters such as 802.11a/b/g and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

13.2 FCC Power Tables & Conditions

	2.45	5.15 - 5.35	5.47 - 5.85	GHz
P_{Ref}	12	6	5	mW

Device output power should be rounded to the nearest mW to compare with values specified in this table.



Table 13-1
Output Power Thresholds for Unlicensed Transmitters

	Individual Transmitter	Simultaneous Transmission
Licensed Transmitters	<u>Routine evaluation required</u>	SAR not required:
Unlicensed Transmitters	<p><u>When there is no simultaneous transmission –</u></p> <ul style="list-style-type: none"> output $\leq 60/f$: SAR not required output $> 60/f$: stand-alone SAR required <p><u>When there is simultaneous transmission –</u></p> <p><u>Stand-alone SAR not required when</u></p> <ul style="list-style-type: none"> output $\leq 2 \cdot P_{Ref}$ and antenna is ≥ 5.0 cm from other antennas output $\leq P_{Ref}$ and antenna is ≥ 2.5 cm from other antennas output $\leq P_{Ref}$ and antenna is < 2.5 cm from other antennas, each with either output power $\leq P_{Ref}$ or 1-g SAR < 1.2 W/kg <p><u>Otherwise stand-alone SAR is required</u></p> <p><u>When stand-alone SAR is required</u></p> <ul style="list-style-type: none"> test SAR on highest output channel for each wireless mode and exposure condition if SAR for highest output channel is $> 50\%$ of SAR limit, evaluate all channels according to normal procedures 	<p>Unlicensed only</p> <ul style="list-style-type: none"> when stand-alone 1-g SAR is not required and antenna is ≥ 5 cm from other antennas <p><u>Licensed & Unlicensed</u></p> <ul style="list-style-type: none"> when the sum of the 1-g SAR is < 1.6 W/kg for all simultaneous transmitting antennas when SAR to peak location separation ratio of simultaneous transmitting antenna pair is < 0.3 <p>SAR required:</p> <p><u>Licensed & Unlicensed</u></p> <p>antenna pairs with SAR to peak location separation ratio ≥ 0.3; test is only required for the configuration that results in the highest SAR in stand-alone configuration for each wireless mode and exposure condition</p> <p>Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply</p>

Table 13-2
SAR Evaluation Requirements for Multiple Transmitter Handsets

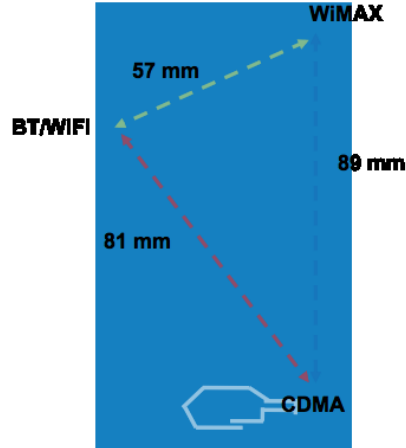
13.3 Adaptation for two simultaneous licensed transmitters

Per KDB inquiry 268378, the KDB 648474 unlicensed – licensed transmitter simultaneous SAR considerations were adapted for the two licensed transmitter CDMA + WIMAX case.

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN	Page 21 of 52	

14 SIMULTANEOUS TX CONSIDERATIONS

14.1 Transmit Antenna Separation Distances



RF Conducted Power of Bluetooth Tx is 0.532 mW. RF Conducted Power of WLAN is 19.45 mW. The RF Conducted Power of WIMAX is 338 mW.

14.2 Simultaneous Transmission Considerations

All antennas may transmit simultaneously with one another. Bluetooth and WIFI cannot since it is of the same circuit path and are switched.

Please note that the highest simultaneous condition will consist of CDMA+WLAN+WIMAX. Please see **Table 14-1** for numerical summation for all head and body configurations.

Table 14-1
SAR Summation for all simultaneous conditions

	Configuration	Cellular SAR (W/kg)	PCS SAR (W/kg)	WIMAX SAR (W/kg)	WIFI SAR (W/kg)	Σ CDMA + WIMAX + WIFI	Sum < Limit?
Head SAR	Right Cheek	0.658	0.28	0.525	0.067	1.25	PASS
	Right Tilt	0.503	0.435	0.477	0.08	1.06	PASS
	Left Cheek	0.681	0.426	0.431	0.323	1.44	PASS
	Left Tilt	0.47	0.385	0.436	0.074	0.98	PASS
Body SAR	Body-Worn, Back	0.989	0.768	0.256	0.086	1.33	PASS
	Body-Worn, Front	0.463	0.249	0.103	0.021	0.59	PASS

Considering the above simultaneous SAR cases, the summation for the worst-case SAR is below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit. No volumetric SAR summation is required because the numerical sums are below the limit.

FCC ID: A3LSPHD700	PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT			Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN			Page 22 of 52

15 4G WIMAX LINEARITY & SAR CONSIDERATIONS

15.1 Test Setup for Linearity

Testing was performed using test software in order to establish a live connection for the purpose of SAR testing with control symbols deactivated for proper SAR measurements. See operational description regarding the details of the operation of the software.

For each modulation, BW, and zone type, the probe was moved to an arbitrary location with the EUT touching the flat phantom in order to be able to achieve higher SAR values for the purpose of the span of power measurements for the linearity plots, per FCC guidance. Then the point SAR readings from the DASYS software was measured using the “multi-meter” function and recorded with decreasing the RF powers beginning from the highest maximum output power according to the zone type, BW and modulation to a level setting closest to 10 mW.

15.2 Variation from Expected SAR due to WIMAX PAR



The error due to the PAR of WIMAX was between 7%-10%.

15.3 Probe Linearity Data and Linearity Graphs

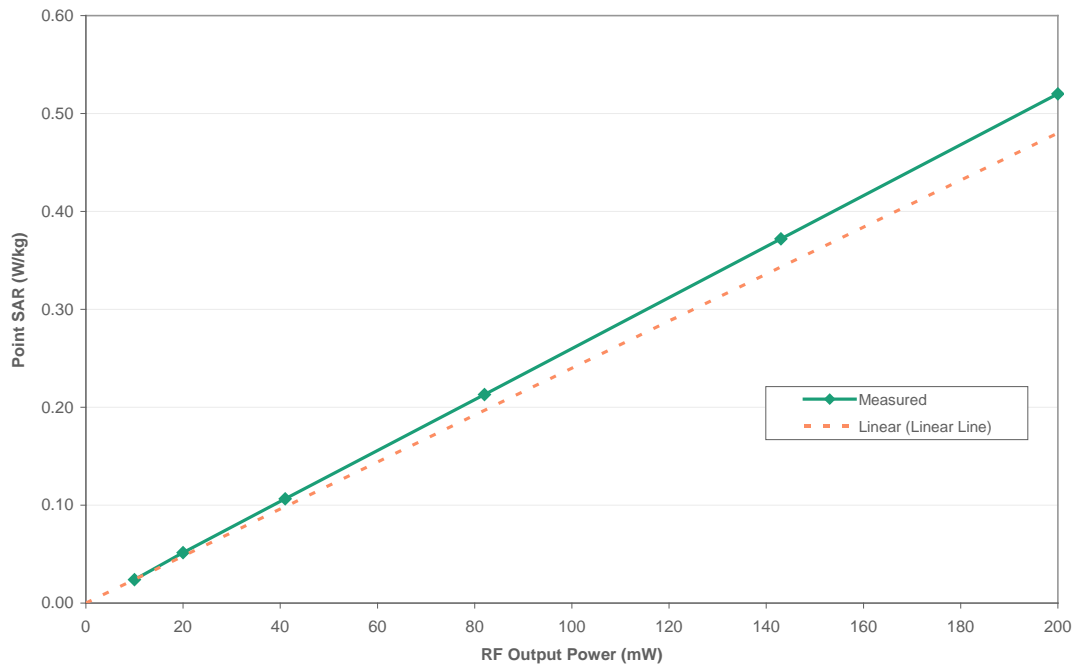
Table 15-1
WIMAX PUSC QPSK Linearity Table for 5 MHz and 10 MHz

Zone	PUSC					
Modulation	QPSK					
Power (mW)	10	20	41	82	143	200
point SAR	0.024	0.05147	0.1064	0.213	0.372	0.520
linear line	0.024	0.0480	0.0984	0.1968	0.3432	0.480
ϵ	0.0%	6.7%	7.5%	7.6%	7.7%	7.7%

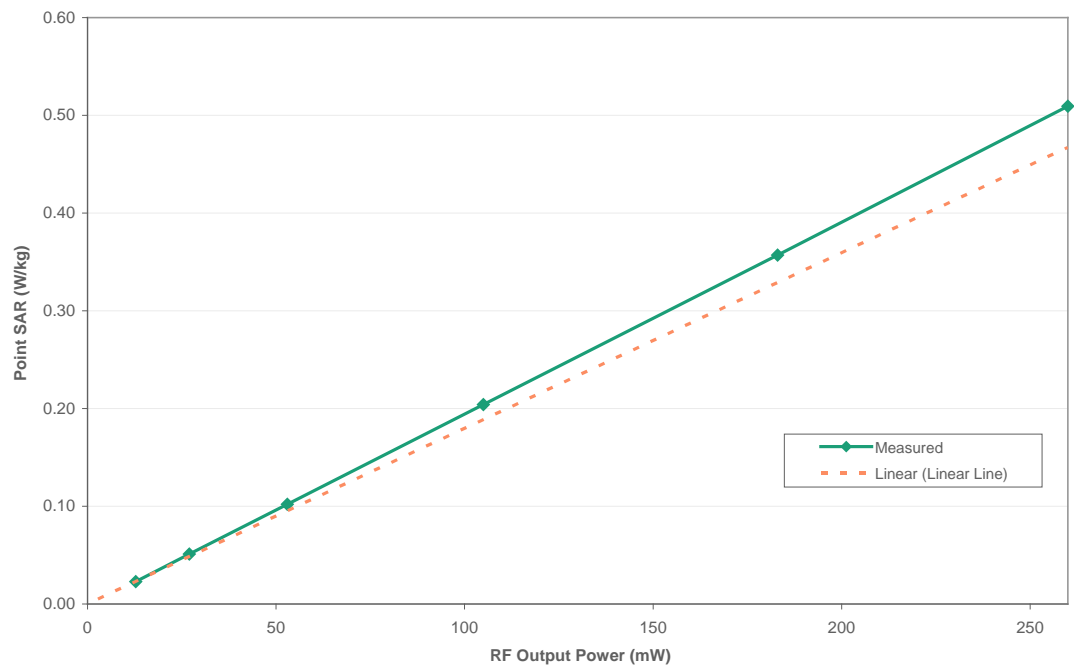
Zone	PUSC					
Modulation	QPSK					
Power (mW)	12.8	27	53	105	183	260
point SAR	0.023	0.0511	0.1020	0.204	0.357	0.5094
linear line	0.023	0.0485	0.0952	0.1887	0.3288	0.4672
ϵ	0.0%	5.1%	6.6%	7.5%	7.9%	8.3%

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Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 23 of 52

PUSC, 5 MHz, QPSK



PUSC, 10 MHz, QPSK





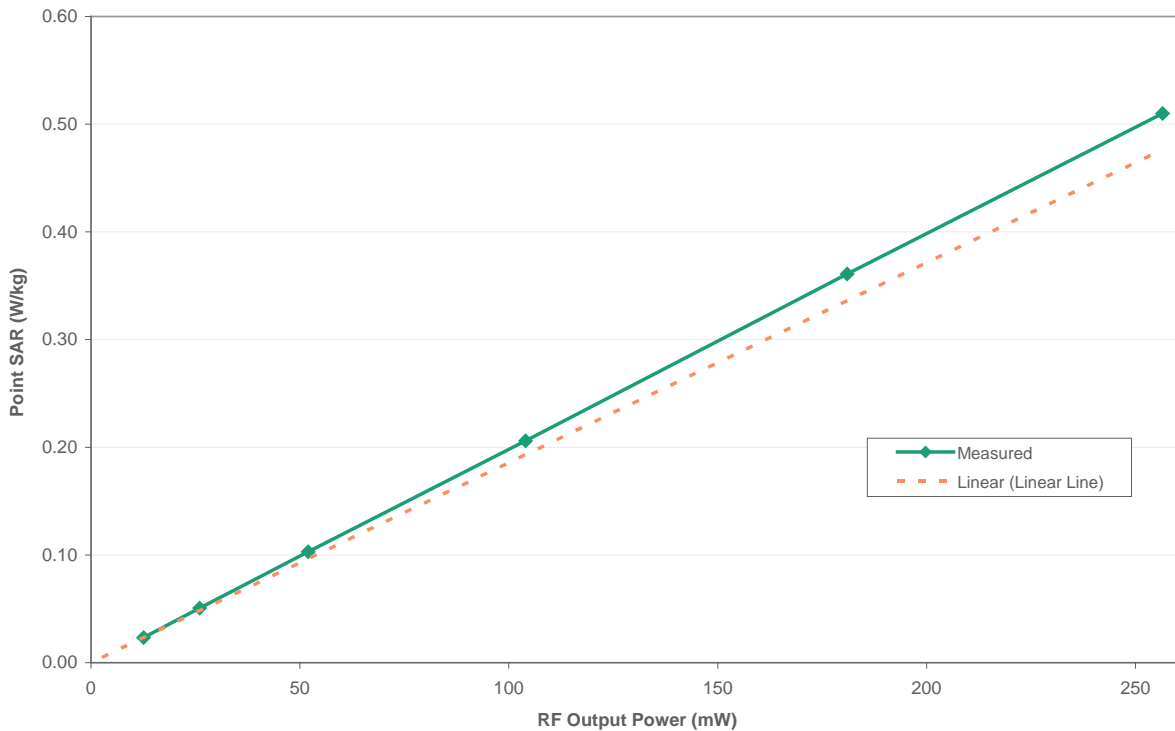


FCC ID: A3LSPHD700		SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 24 of 52

Table 15-2 WIMAX PUSC 16QAM Linearity Table

SAR (W/kg)	Zone	PUSC					
	Modulation	16 QAM					
	Power (mW)	12.6	26	52	104	181	256.5
5 MHz	point SAR	0.0234	0.05061	0.103	0.206	0.361	0.510
	linear line	0.0234	0.0483	0.0966	0.1931	0.3361	0.476
	ϵ	0.0%	4.6%	6.2%	6.2%	6.9%	6.6%
SAR (W/kg)	Zone	PUSC					
	Modulation	16 QAM					
	Power (mW)	12.9	25.8	54	107	186	258
10 MHz	point SAR	0.024	0.05003	0.1068	0.2145	0.3740	0.520
	linear line	0.024	0.0480	0.1005	0.1991	0.3460	0.480
	ϵ	0.0%	4.1%	5.9%	7.2%	7.5%	7.7%

PUSC, 5 MHz, 16QAM



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Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN	Page 25 of 52	

PUSC, 10 MHz, 16QAM

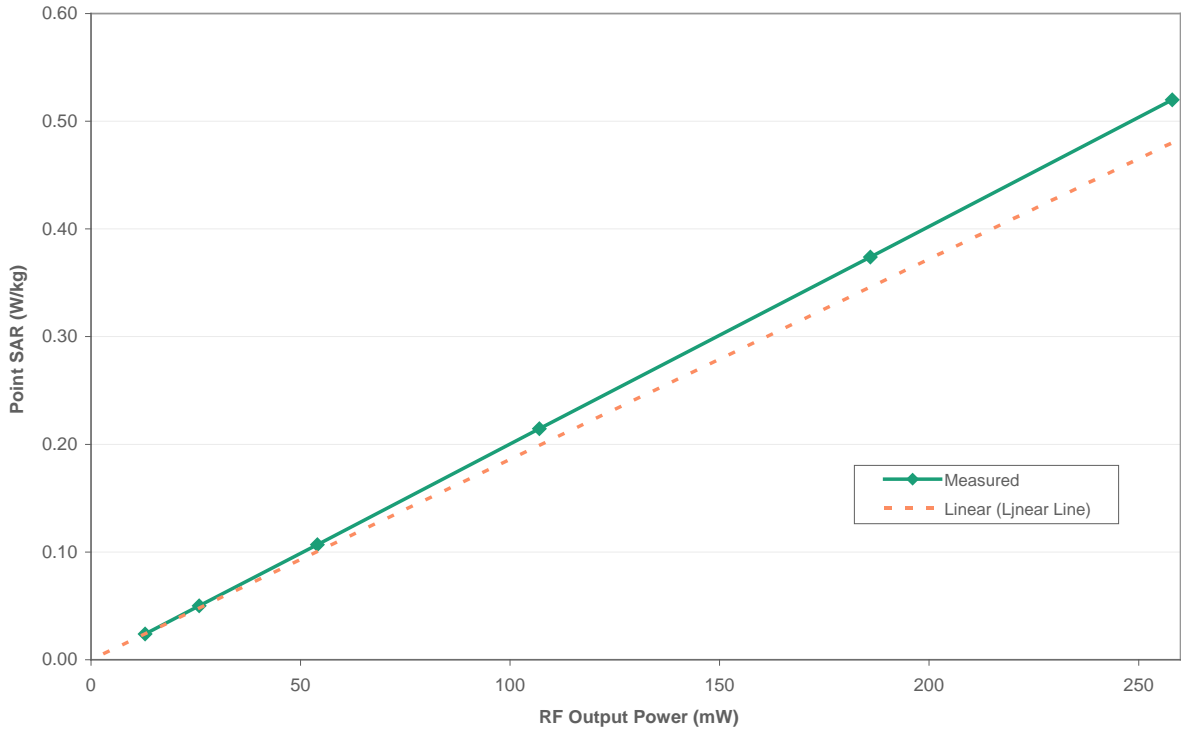
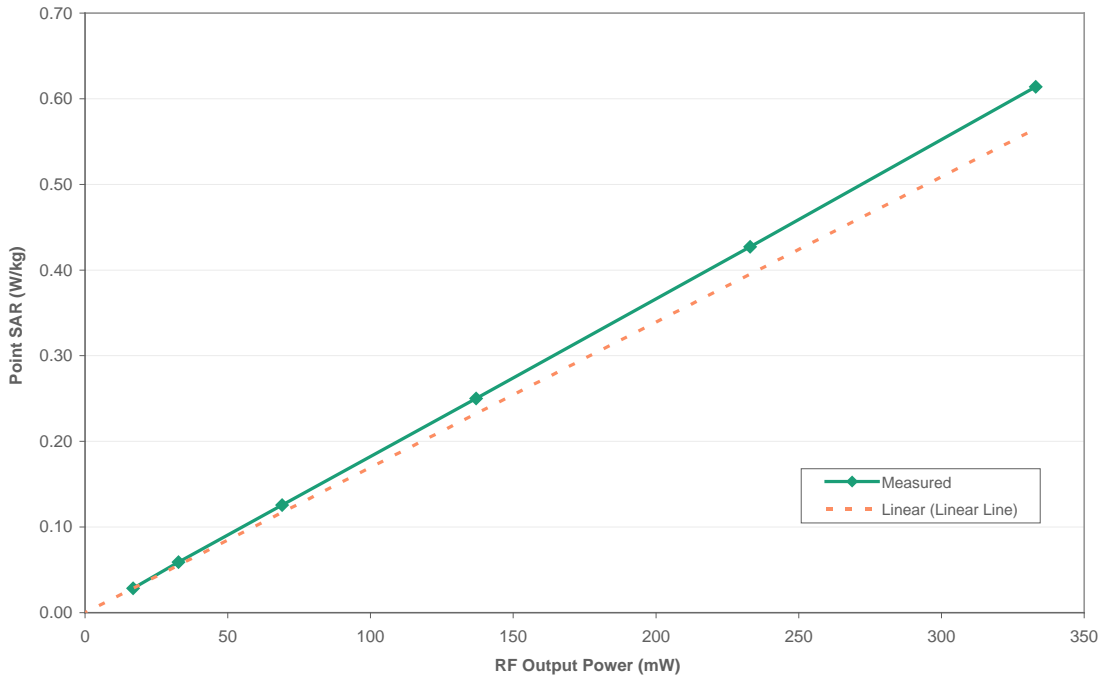


Table 15-3 WIMAX AMC QPSK Linearity Table

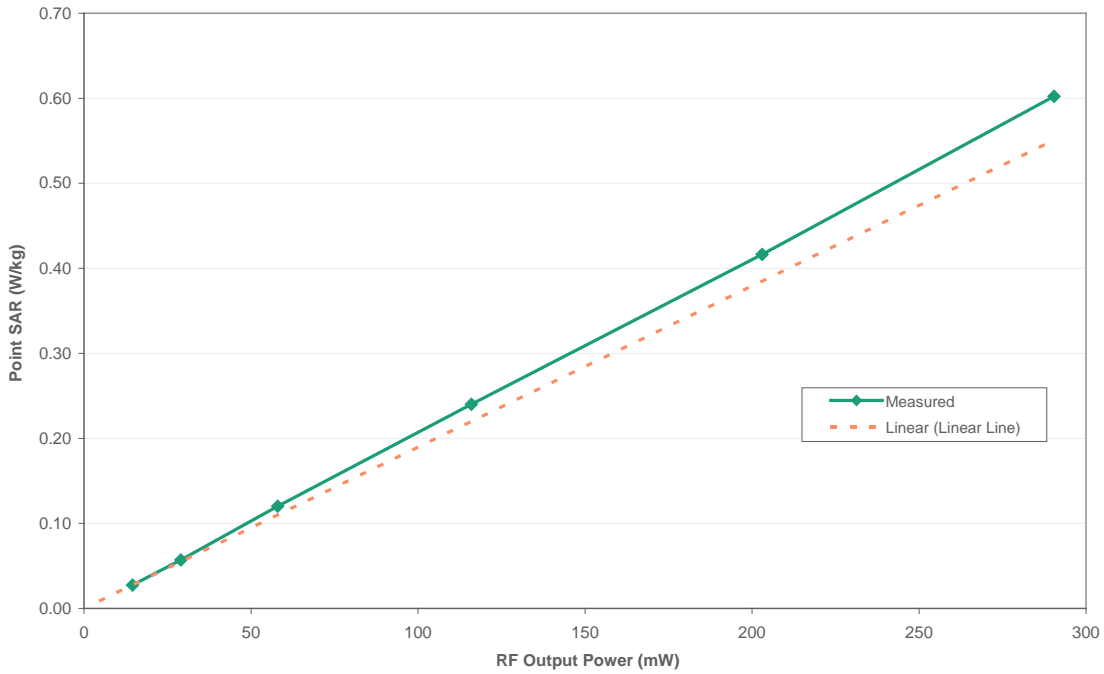
SAR (W/kg)	Zone	AMC					
	Modulation	QPSK					
	Power (mW)	16.8	32.7	69	137	233	333
5 MHz	point SAR	0.0285	0.05902	0.1257	0.250	0.4271	0.614
	linear line	0.0285	0.0555	0.1171	0.2324	0.3953	0.5649
	ϵ	0.0%	6.0%	6.9%	7.0%	7.5%	8.0%
SAR (W/kg)	Zone	AMC					
	Modulation	QPSK					
	Power (mW)	14.5	29	58	116	203	290.4
10 MHz	point SAR	0.0275	0.0570	0.1202	0.2401	0.4164	0.6022
	linear line	0.0275	0.0550	0.1100	0.2200	0.3850	0.5508
	ϵ	0.0%	3.6%	8.5%	8.4%	7.5%	8.5%

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Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 26 of 52

AMC, 5 MHz, QPSK



AMC, 10 MHz, QPSK





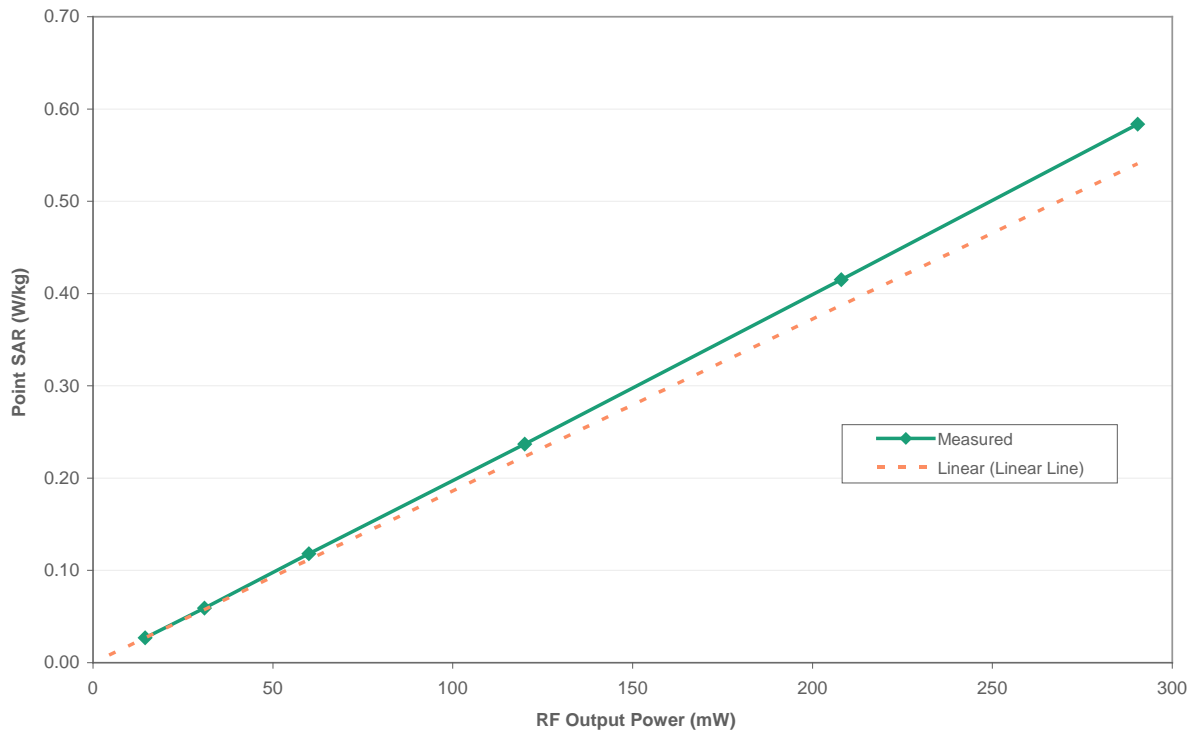
FCC ID: A3LSPHD700		SAR COMPLIANCE REPORT	 Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN	Page 27 of 52

Table 15-4 WIMAX AMC 16QAM Linearity Table

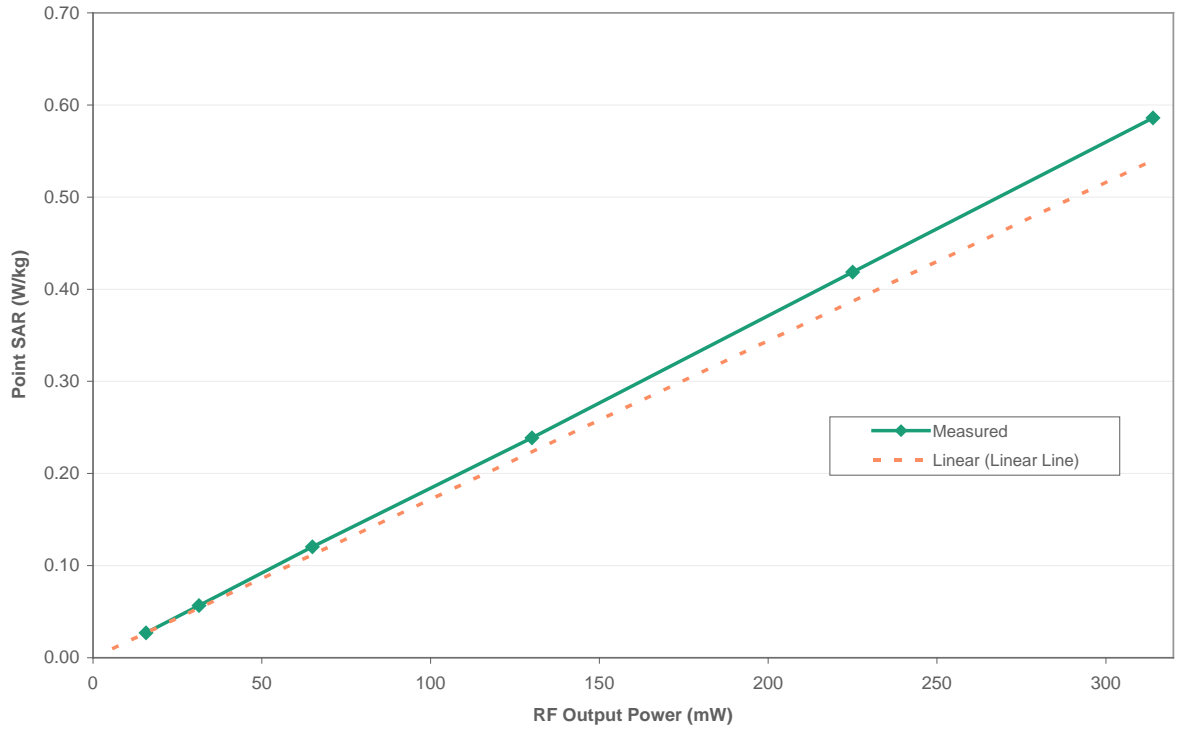
SAR (W/kg)	Zone	AMC					
	Modulation	16 QAM					
	Power (mW)	14.5	31	60	120	208	290.4
5 MHz	point SAR	0.027	0.05927	0.118	0.237	0.415	0.5835
	linear line	0.027	0.0577	0.1117	0.2234	0.3873	0.541
	ϵ	0.0%	2.6%	5.3%	5.7%	6.7%	7.3%
SAR (W/kg)	Zone	AMC					
	Modulation	16 QAM					
	Power (mW)	15.7	31.4	65	130	225	314
10 MHz	point SAR	0.027	0.05659	0.1204	0.2387	0.4186	0.5860
	linear line	0.027	0.0540	0.1118	0.2236	0.3869	0.5400
	ϵ	0.0%	4.6%	7.2%	6.3%	7.6%	7.8%



AMC, 5 MHz, 16QAM



FCC ID: A3LSPHD700	PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN	Page 28 of 52	

AMC, 10 MHz, 16QAM



FCC ID: A3LSPHD700	 PCTEST <small>ENGINEERING LABORATORY, INC.</small>	SAR COMPLIANCE REPORT	 Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN	Page 29 of 52

15.4 Spectrum Analyzer Plots

Although the “spike” at the onset of the signal has no significant contribution to the output power (and SAR) the instant pulse is caused by RX/TX transition in TDD system. Visually, the switching noise on the plot is determined by the spectrum analyzer settings (i.e. changing the sweep time or changing the number of points will cause the spike to not be visible).

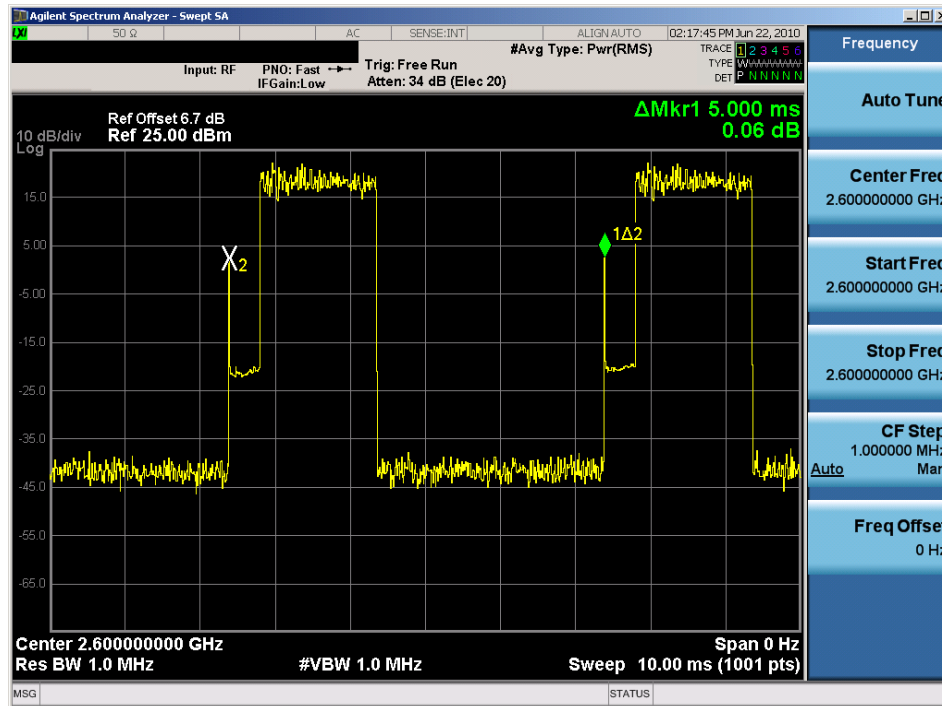




Table 15-5 Timing Plot for WIMAX Signal

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 30 of 52

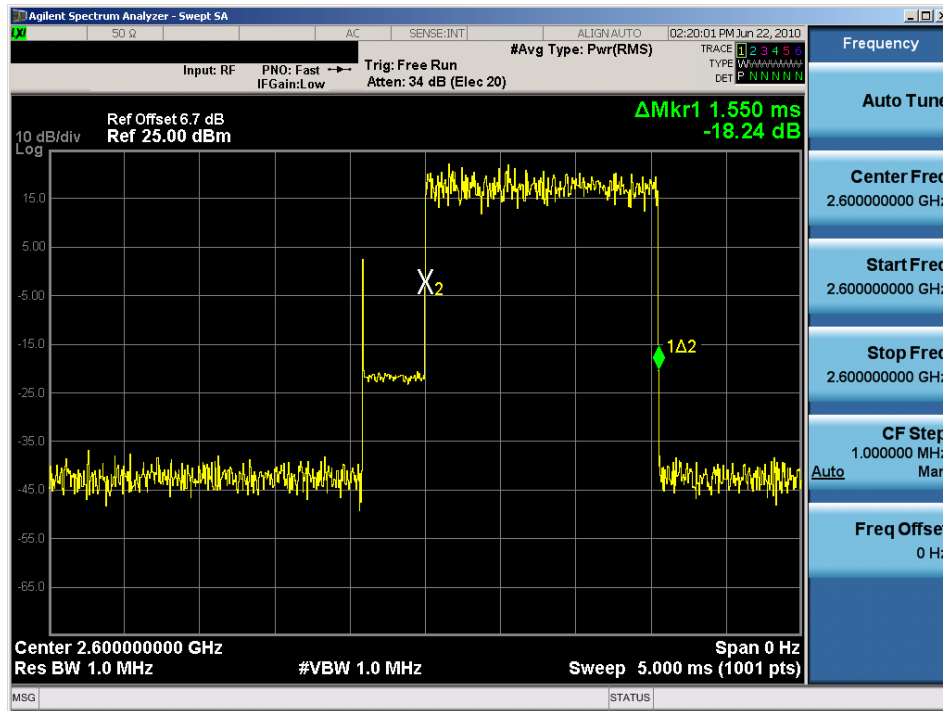


Table 15-6 WIMAX Pulse with 15 Traffic on, 3 controls inactive (DC)

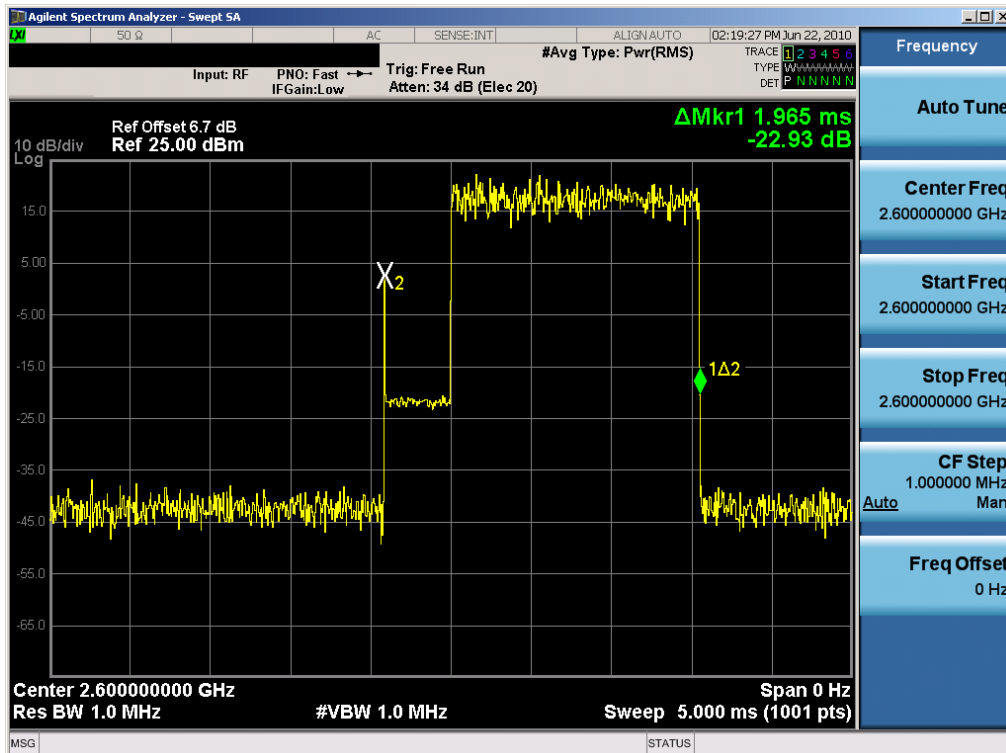




Table 15-7 WIMAX Timing Plot burst

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 31 of 52

15.5 DASY Crest Factor Calculations

Frame Averaged Duty Cycle:

$$15 / 48 = 0.3125$$

Crest Factor for DASY SAR: $1/0.3125 = 3.2$

15.6 SAR Scaling Factor Calculations

The below scaling factors were applied to the measured SAR results for the corresponding WIMAX SAR modes tested.

The maximum rated power for all modes is 338.8mW. The control symbol power is

Below is a **sample calculation** for the scaling factor based on the low channel of the 10 MHz BW for PUSC_QPSK1/2 powers.

$$\text{SAR Scaling Factor (Low Ch, 10 MHz, PUSC, QPSK)} = \frac{[(338.8 * \frac{5}{35}) * 3 + 338.8 * 15]}{260.02 * 15} = 1.34$$



FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: 0Y1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 32 of 52



Table 15-8
SAR Scaling Factors for 5MHz BW modulations

Frequency [MHz]	Modulation	5MHz Max Power		
		Average (dBm)	Average (mW)	SAR Scaling Factor
Low Channel	PUSC_QPSK1/2	24.53	283.79	1.26
	PUSC_16QAM1/2	24.09	256.45	1.40
	BAMC2*3_QPSK1/2	25.23	333.43	1.08
	BAMC2*3_16QAM1/2	24.63	290.40	1.24
Mid Channel	PUSC_QPSK1/2	23.03	200.91	1.79
	PUSC_16QAM1/2	23.12	205.12	1.75
	BAMC2*3_QPSK1/2	23.34	215.77	1.66
	BAMC2*3_16QAM1/2	23.46	221.82	1.62
High Channel	PUSC_QPSK1/2	23.50	223.87	1.60
	PUSC_16QAM1/2	24.23	264.85	1.35
	BAMC2*3_QPSK1/2	23.87	243.78	1.47
	BAMC2*3_16QAM1/2	24.24	265.46	1.35

Table 15-9
SAR Scaling Factors for 10MHz BW modulations

Frequency [MHz]	Modulation	10MHz Max Power		
		Average (dBm)	Average (mW)	SAR Scaling Factor
Low	PUSC_QPSK1/2	24.15	260.02	1.34
	PUSC_16QAM1/2	24.11	257.63	1.35
	BAMC2*3_QPSK1/2	24.63	290.40	1.20
	BAMC2*3_16QAM1/2	24.97	314.05	1.11
Mid	PUSC_QPSK1/2	23.32	214.78	1.62
	PUSC_16QAM1/2	23.08	203.24	1.71
	BAMC2*3_QPSK1/2	23.19	208.45	1.67
	BAMC2*3_16QAM1/2	23.08	203.24	1.71
High	PUSC_QPSK1/2	23.29	213.30	1.63
	PUSC_16QAM1/2	23.40	218.78	1.59
	BAMC2*3_QPSK1/2	24.22	264.24	1.32
	BAMC2*3_16QAM1/2	23.51	224.39	1.55

The rated power for each zone is within the tune-up range of 22.9 – 25.3 dBm. The rated maximum power are the same for all higher coding rates.

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 33 of 52

16 FCC 3G MEASUREMENT PROCEDURES

Power measurements were performed using a base station simulator under digital average power.

16.1 Procedures Used to Establish RF Signal for SAR

The device was placed into a simulated call using a base station simulator in a shielded chamber. Such test signals offer a consistent means for testing SAR and are recommended for evaluating SAR [4]. SAR measurements were taken with a fully charged battery. In order to verify that the device was tested and maintained at full power, it was configured with the base station simulator. The SAR measurement software calculates a reference point at the start and end of the test to check for power drifts. If conducted power deviations of more than 5% occurred, the tests were repeated.

16.2 SAR Measurement Conditions for CDMA2000

The following procedures were followed according to FCC "SAR Measurement Procedures for 3G Devices" v02, October 2007.

16.2.1 Output Power Verification

See 3GPP2 C.S0011/TIA-98-E as recommended by "SAR Measurement Procedures for 3G Devices" v02, October 2007. Maximum output power is verified on the High, Middle and Low channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. SO55 tests were measured with power control bits in "All Up" condition. .

1. If the mobile station (MS) supports Reverse TCH RC 1 and Forward TCH RC 1, set up a call using Fundamental Channel Test Mode 1 (RC=1/1) with 9600 bps data rate only.
2. Under RC1, C.S0011 Table 4.4.5.2-1, Table 13-1 parameters were applied.
3. If the MS supports the RC 3 Reverse FCH, RC3 Reverse SCH0 and demodulation of RC 3,4, or 5, set up a call using Supplemental Channel Test Mode 3 (RC 3/3) with 9600 bps Fundamental Channel and 9600 bps SCH0 data rate.
4. Under RC3, C.S0011 Table 4.4.5.2-2, Table 13-2 was applied.
5. FCHs were configured at full rate for maximum SAR with "All Up" power control bits.

Table 16-1
Parameters for Max. Power for RC1



Parameter	Units	Value
I_{or}	dBm/1.23 MHz	-104
$\frac{Pilot E_c}{I_{or}}$	dB	-7
$\frac{Traffic E_c}{I_{or}}$	dB	-7.4

Table 16-2
Parameters for Max. Power for RC3

Parameter	Units	Value
I_{or}	dBm/1.23 MHz	-86
$\frac{Pilot E_c}{I_{or}}$	dB	-7
$\frac{Traffic E_c}{I_{or}}$	dB	-7.4

16.2.2 Head SAR Measurements

SAR for head exposure configurations is measured in RC3 with the DUT configured to transmit at full rate using Loopback Service Option SO55. SAR for RC1 is not required when the maximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1 using the exposure configuration that results in the highest SAR for that channel in RC3.

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 34 of 52



16.2.3 Body SAR Measurements

SAR for body exposure configurations is measured in RC3 with the DUT configured to transmit at full rate on FCH with all other code channels disabled using TDSO / SO32. SAR for multiple code channels (FCH + SCH_n) is not required when the maximum average output of each RF channel is less than ¼ dB higher than that measured with FCH only. Otherwise, SAR is measured on the maximum output channel (FCH + SCH_n) with FCH at full rate and SCH₀ enabled at 9600 bps using the exposure configuration that results in the highest SAR for that channel with FCH only. When multiple code channels are enabled, the DUT output may shift by more than 0.5 dB and lead to higher SAR drifts and SCH dropouts. Body SAR was measured using TDSO / SO32 with power control bits in the “All Up”

Body SAR in RC1 is not required when the maximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1; with Loopback Service Option SO55, at full rate, using the body exposure configuration that results in the highest SAR for that channel in RC3.

16.2.4 Handsets with EVDO

For handsets with Ev-Do capabilities, when the maximum average output of each channel in Rev. 0 is less than ¼ dB higher than that measured in RC3 (1x RTT), body SAR for EV-DO is not required. Otherwise, SAR for Rev. 0 is measured on the maximum output channel at 153.6 kbps using the body exposure configuration that results in the highest SAR for that channel in RC3. SAR for Rev. A is not required when the maximum average output of each channel is less than that measured in Rev. 0 or less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel for Rev. A using a Reverse Data Channel payload size of 4096 bits and a Termination Target of 16 slots defined for Subtype 2 Physical Layer configurations. A Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with the ACK Channel transmitting in all slots should be configured in the downlink for both Rev. 0 and Rev. A.

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 35 of 52

17 RF CONDUCTED POWERS

17.1 CDMA Conducted Powers

Band	Channel	SO55 [dBm]	TDSO SO32 FCH [dBm]	TDSO SO32 FCH+SCH [dBm]	1x EvDO Rev. 0 [dBm]
	F-RC	RC3	RC3	RC3	(RTAP)
	Vocoder Rate	Full	N/A	N/A	N/A
Cellular	1013	24.78	24.83	24.74	25.00
	384	24.62	24.62	25.55	24.65
	777	24.68	24.70	24.66	24.72
PCS	25	25.09	25.10	25.10	24.92
	600	24.83	24.88	24.87	24.90
	1175	25.04	25.14	25.11	24.91



Table 17-1
Power Measurement Setup

17.2 IEEE 802.11b Conducted Powers

Freq [MHz]	Channel	Data Rate [Mbps]	Average Power (dBm)
2412	1	1	12.89
		2	12.52
		5.5	12.47
		11	12.49
2437	6	1	10.70
		2	11.00
		5.5	10.93
		11	10.98
2462	11	1	9.24
		2	9.50
		5.5	9.33
		11	9.27

FCC ID: A3LSPHD700	PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 36 of 52

17.3 IEEE 802.11g Conducted Powers

Freq [MHz]	Channel	Data Rate [Mbps]	Average Power (dBm)
2412	1	6	9.67
		9	9.55
		12	9.50
		18	9.47
		24	9.35
		36	9.44
		48	9.25
2437	6	54	8.78
		6	8.02
		9	7.72
		12	7.61
		18	7.52
		24	7.67
		36	7.68
2462	11	48	7.45
		54	7.04
		6	6.85
		9	6.51
		12	6.74
		18	6.94
		24	6.63
	36	6.75	
	48	6.49	
	54	6.19	

17.4 IEEE 802.11n Conducted Powers

Freq [MHz]	Channel	MCS Index	Data Rate [Mbps]	Average Power (dBm)
2412	1	HT0	13.5/15	6.55
		HT1	27/30	6.45
		HT2	40/45	6.54
		HT3	54/60	6.41
		HT4	81/90	6.26
		HT5	108/120	6.23
		HT6	121.5/135	5.85
		HT7	135/150	5.67
2437	6	HT0	13.5/15	4.88
		HT1	27/30	4.74
		HT2	40/45	4.83
		HT3	54/60	4.35
		HT4	81/90	4.53
		HT5	108/120	4.43
		HT6	121.5/135	4.03
		HT7	135/150	4.19
2462	11	HT0	13.5/15	4.16
		HT1	27/30	4.01
		HT2	40/45	3.91
		HT3	54/60	4.04
		HT4	81/90	3.85
		HT5	108/120	3.84
		HT6	121.5/135	4.00
		HT7	135/150	3.66

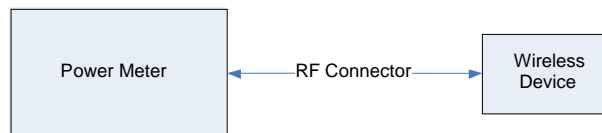




Table 17-2
Power Measurement Setup

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 37 of 52



18 SAR DATA SUMMARY

18.1 Cell. CDMA Head SAR Results

MEASUREMENT RESULTS								
FREQUENCY		Mode/Band	C_Power[dBm]		Side	Test Position	Battery Type	SAR (1g)
MHz	Ch.		Start	End				(W/kg)
836.52	384	Cell. CDMA	24.62	24.55	Right	Touch	Standard	0.658
836.52	384	Cell. CDMA	24.62	24.59	Right	Tilt	Standard	0.503
836.52	384	Cell. CDMA	24.62	24.89	Left	Touch	Standard	0.681
836.52	384	Cell. CDMA	24.62	24.56	Left	Tilt	Standard	0.470
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Brain 1.6 W/kg (mW/g) averaged over 1 gram		

Notes:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001].
2. All modes of operation were investigated, and worst-case results are reported.
3. Batteries are fully charged for all readings.
4. Tissue parameters and temperatures are listed on the SAR plots.
5. Liquid tissue depth was at least 15.0 cm.
6. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (June 2001) and Public Notice DA-02-1438, if the SAR measured at the middle channel for each test configuration (left, right, cheek/touch, tilt/ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
7. CDMA2000 mode was tested under RC3/SO55.



FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 38 of 52

18.2 PCS CDMA Head SAR Results

MEASUREMENT RESULTS								
FREQUENCY		Mode/Band	C_Power[dBm]		Side	Test Position	Battery Type	SAR (1g)
MHz	Ch.		Start	End				(W/kg)
1880.00	600	PCS CDMA	24.83	24.83	Right	Touch	Standard	0.280
1880.00	600	PCS CDMA	24.83	24.61	Right	Tilt	Standard	0.435
1880.00	600	PCS CDMA	24.83	24.65	Left	Touch	Standard	0.426
1880.00	600	PCS CDMA	24.83	24.95	Left	Tilt	Standard	0.385
ANSI / IEEE C95.1 1992 - SAFETY LIMIT						Brain		
Spatial Peak						1.6 W/kg (mW/g)		
Uncontrolled Exposure/General Population						averaged over 1 gram		

Notes:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001].
2. All modes of operation were investigated, and worst-case results are reported.
3. Batteries are fully charged for all readings.
4. Tissue parameters and temperatures are listed on the SAR plots.
5. Liquid tissue depth was at least 15.0 cm.
6. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (June 2001) and Public Notice DA-02-1438, if the SAR measured at the middle channel for each test configuration (left, right, cheek/touch, tilt/ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
7. CDMA2000 mode was tested under RC3/SO55.



FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 39 of 52

18.3 2.6 GHz WIMAX Head SAR Results

MEASUREMENT RESULTS											
FREQUENCY MHz	Mode/Band	Zone Type	Modulation	Bandwidth (MHz)	C_Power[dBm]		Side	Test Position	Battery Type	SAR (1g)	Scaled SAR
					Start	End				(W/kg)	(W/kg)
2501	2.6 GHz WIMAX	Band AMC	QPSK	5	25.23	25.17	Right	Touch	Standard	0.401	0.431
2501	2.6 GHz WIMAX	PUSC	QPSK	5	24.53	24.64	Right	Touch	Standard	0.382	0.483
2501	2.6 GHz WIMAX	PUSC	16 QAM	5	24.09	24.13	Right	Touch	Standard	0.375	0.525
2501	2.6 GHz WIMAX	PUSC	QPSK	10	24.15	24.21	Right	Touch	Standard	0.372	0.499
2501	2.6 GHz WIMAX	PUSC	16 QAM	10	24.11	24.16	Right	Touch	Standard	0.375	0.507
2501	2.6 GHz WIMAX	Band AMC	16 QAM	5	25.23	25.22	Right	Tilt	Standard	0.368	0.455
2501	2.6 GHz WIMAX	PUSC	QPSK	5	24.53	24.55	Right	Tilt	Extended	0.341	0.431
2501	2.6 GHz WIMAX	PUSC	16 QAM	5	24.09	24.12	Right	Tilt	Standard	0.341	0.477
2501	2.6 GHz WIMAX	PUSC	QPSK	10	24.15	24.20	Right	Tilt	Standard	0.335	0.449
2501	2.6 GHz WIMAX	PUSC	16 QAM	10	24.11	24.10	Right	Tilt	Standard	0.334	0.452
2501	2.6 GHz WIMAX	Band AMC	16 QAM	5	25.23	25.26	Left	Touch	Standard	0.326	0.403
2501	2.6 GHz WIMAX	PUSC	QPSK	5	24.53	24.57	Left	Touch	Standard	0.296	0.374
2501	2.6 GHz WIMAX	PUSC	16 QAM	5	24.09	24.12	Left	Touch	Standard	0.308	0.431
2501	2.6 GHz WIMAX	PUSC	QPSK	10	24.15	24.16	Left	Touch	Standard	0.298	0.399
2501	2.6 GHz WIMAX	PUSC	16 QAM	10	24.11	24.16	Left	Touch	Standard	0.298	0.403
2501	2.6 GHz WIMAX	Band AMC	QPSK	5	25.23	25.26	Left	Tilt	Standard	0.34	0.430
2600	2.6 GHz WIMAX	PUSC	QPSK	5	24.53	24.56	Left	Tilt	Standard	0.314	0.397
2501	2.6 GHz WIMAX	PUSC	16 QAM	5	24.09	24.13	Left	Tilt	Standard	0.312	0.436
2600	2.6 GHz WIMAX	PUSC	QPSK	10	24.15	24.18	Left	Tilt	Standard	0.308	0.413
2687	2.6 GHz WIMAX	PUSC	16 QAM	10	24.11	24.15	Left	Tilt	Standard	0.307	0.415
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram		

Notes:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001].
2. Batteries are fully charged for all readings.
3. Tissue parameters and temperatures are listed on the SAR plots.
4. Liquid tissue depth was at least 15.0 cm.
5. Scaling factors were applied to the measured SAR results, as described in section 15.6.
6. WIMAX Test configurations were chosen per KDB inquiry 130743
7. Justification for Reduced test configurations per April 2010 TCB Workshop Slides:
 - a. The lowest coding rate was used for SAR testing since the same rated maximum output power applies to all rates. Higher coding rates were not higher in output power.
 - b. Scaled SAR was used to determine if mid-channel only was required when SAR is below 3 dB of the SAR limit (i.e. 0.8 W/kg), provided the bandwidth was within 10% of the center frequency (per IEEE 6.3.3). However, since powers were more than 0.5 dB higher for low and/or high channel compared to mid channel, the channel with the highest output power was tested for SAR.
 - c. Out of the highest PUSC BW and modulation, the corresponding BAMC was chosen for each configuration
8. WIMAX mode does not have voice capability, but can transmit simultaneously with a CDMA voice call. Therefore the above results were used to evaluate simultaneous transmission cases only.
9. Head SAR data is only applicable for simultaneous transmission calculations and is thus applied accordingly, since there is no held-to-ear configuration applicable with WIMAX standalone.



FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN	Page 40 of 52	

18.4 2.4 GHz WLAN Head SAR Results

MEASUREMENT RESULTS									
FREQUENCY		Mode	C_Power[dBm]		Side	Test Position	Battery Type	Data Rate (Mbps)	SAR (1g)
MHz	Ch.		Start	End					(W/kg)
2412	1	2.4 GHz WLAN	12.89	12.84	Right	Touch	Standard	1	0.064
2437	6	2.4 GHz WLAN	10.70	10.71	Right	Touch	Standard	1	0.067
2412	1	2.4 GHz WLAN	12.89	13.12	Right	Tilt	Standard	1	0.067
2437	6	2.4 GHz WLAN	10.70	10.73	Right	Tilt	Standard	1	0.080
2412	1	2.4 GHz WLAN	12.89	12.94	Left	Touch	Standard	1	0.323
2437	6	2.4 GHz WLAN	10.70	10.89	Left	Touch	Standard	1	0.117
2412	1	2.4 GHz WLAN	12.89	12.97	Left	Tilt	Standard	1	0.054
2437	6	2.4 GHz WLAN	10.70	10.63	Left	Tilt	Standard	1	0.074
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Brain 1.6 W/kg (mW/g) averaged over 1 gram			

Notes:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001].
2. All modes of operation were investigated, and worst-case results are reported.
3. Batteries are fully charged for all readings.
4. Tissue parameters and temperatures are listed on the SAR plots.
5. Liquid tissue depth was at least 15.0 cm.
6. IEEE 802.11b mode was tested under 1 Mbps.
7. WLAN transmission was verified using a spectrum analyzer.
8. For 802.11 and other test reduction procedures, please refer to April TCB slides for methods followed. The highest average RF output power channel between 802.11 modes was ensured to have been tested.
9. Mid channel was additionally tested.



FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 41 of 52

18.5 CDMA Body SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	C_Power[dBm]		Position	Spacing	Battery Type	Side	SAR (1g)
MHz	Ch.			Start	End					(W/kg)
824.70	1013	Cell. CDMA	TDSO32	24.83	25.12	Body	1.5 cm	Standard	back	0.891
836.52	384	Cell. CDMA	TDSO32	24.62	24.48	Body	1.5 cm	Standard	back	0.989
848.31	777	Cell. CDMA	TDSO32	24.70	24.69	Body	1.5 cm	Standard	back	0.901
836.52	384	Cell. CDMA	TDSO32	24.62	24.49	Body	1.5 cm	Standard	front	0.463
1880.00	600	PCS CDMA	TDSO32	24.88	24.62	Body	1.5 cm	Standard	back	0.768
1880.00	600	PCS CDMA	TDSO32	24.88	25.00	Body	1.5 cm	Standard	front	0.249
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram			

Notes:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001].
2. All modes of operation were investigated, and worst-case results are reported.
3. Tissue parameters and temperatures are listed on the SAR plots.
4. Batteries are fully charged for all readings.
5. Liquid tissue depth was at least 15.0 cm.
6. Device was tested using a fixed spacing.
7. Justification for reduced test configurations: This model supports EV-DO. The maximum average output of each channel in EVDO Rev. 0 and Rev. A is less than ¼ dB higher than that measured in RC3 (1x RTT). Therefore Body SAR is not required for EV-DO mode.
8. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (June 2001) and Public Notice DA-02-1438, if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
9. Body SAR was tested under RC3/SO32 with FCH only since FCH+SCH modes are not greater than 0.25 dB of the FCH only mode.



FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN	Page 42 of 52	

18.6 2.6 GHz WIMAX Body SAR Results

MEASUREMENT RESULTS												
FREQUENCY MHz	Mode	Zone Type	Modulation	Bandwidth (MHz)	C_Power[dBm]		Position	Spacing	Battery Type	Side	Measured SAR (W/kg)	Scaled SAR (W/kg)
					Start	End						
2501	2.6 GHz WIMAX	PUSC	QPSK	5	24.53	24.67	Body	1.5 cm	Standard	back	0.118	0.149
2501	2.6 GHz WIMAX	PUSC	16QAM	5	24.09	24.14	Body	1.5 cm	Standard	back	0.120	0.168
2600	2.6 GHz WIMAX	PUSC	QPSK	10	24.15	24.17	Body	1.5 cm	Standard	back	0.123	0.165
2501	2.6 GHz WIMAX	PUSC	16QAM	10	24.11	24.12	Body	1.5 cm	Standard	back	0.122	0.165
2501	2.6 GHz WIMAX	Band AMC	QPSK	5	25.23	25.23	Body	1.5 cm	Standard	back	0.114	0.123
2600	2.6 GHz WIMAX	Band AMC	QPSK	5	23.34	23.21	Body	1.5 cm	Standard	back	0.133	0.221
2687	2.6 GHz WIMAX	Band AMC	QPSK	5	23.87	23.87	Body	1.5 cm	Standard	back	0.174	0.256
2501	2.6 GHz WIMAX	Band AMC	QPSK	10	24.63	24.63	Body	1.5 cm	Standard	back	0.130	0.156
2600	2.6 GHz WIMAX	Band AMC	QPSK	10	23.19	23.80	Body	1.5 cm	Standard	back	0.100	0.166
2687	2.6 GHz WIMAX	Band AMC	QPSK	10	24.22	24.22	Body	1.5 cm	Standard	back	0.180	0.237
2501	2.6 GHz WIMAX	PUSC	QPSK	5	24.53	24.65	Body	1.5 cm	Standard	front	0.061	0.077
2501	2.6 GHz WIMAX	PUSC	16QAM	5	24.09	24.12	Body	1.5 cm	Standard	front	0.060	0.083
2501	2.6 GHz WIMAX	PUSC	QPSK	10	24.15	24.16	Body	1.5 cm	Standard	front	0.062	0.103
2501	2.6 GHz WIMAX	PUSC	16QAM	10	24.11	24.24	Body	1.5 cm	Standard	front	0.064	0.086
2501	2.6 GHz WIMAX	Band AMC	QPSK	10	24.63	24.65	Body	1.5 cm	Standard	front	0.067	0.081
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body				
Spatial Peak								1.6 W/kg (mW/g)				
Uncontrolled Exposure/General Population								averaged over 1 gram				

Notes:

- The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001].
- All modes of operation were investigated, and worst-case results are reported.
- Tissue parameters and temperatures are listed on the SAR plots.
- Batteries are fully charged for all readings.
- Liquid tissue depth was at least 15.0 cm.
- Device was tested using a fixed spacing.
- Scaling factors were applied to the measured SAR results, as described in section 15.6.
- WIMAX Test configurations were determined per FCC KDB inquiry 130743
- Justification for Reduced test configurations per April 2010 TCB Workshop Slides:
 - The lowest coding rate was used for SAR testing since the same rated maximum output power applies to all rates. Higher coding rates were not higher in output power.
 - Scaled SAR was used to determine if mid-channel only was required when SAR is below 3 dB of the SAR limit (i.e. 0.8 W/kg), provided the bandwidth was within 10% of the center frequency (per IEEE 6.3.3). However, since powers were more than 0.5 dB higher for low and/or high channel compared to mid channel, the channel with the highest output power was tested for SAR.
 - Out of the highest PUSC BW and modulation, the corresponding BAMC was chosen for each configuration
 - The highest channel output power (low channel) for WIMAX was chosen for testing since the RF output powers were higher than 0.5 dB than the middle channel.
- Middle and high channels were additionally tested for Band AMC QPSK at 5 and 10 MHz.



FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 43 of 52

18.7 2.4 GHz Body SAR Results

MEASUREMENT RESULTS											
FREQUENCY		Mode	C_Power[dBm]		Position	Service	Spacing	Battery Type	Data Rate (Mbps)	Side	SAR
MHz	Ch.		Start	End							(W/kg)
2412	1	2.4 GHz WLAN	12.89	13.06	Body	DSSS	1.5 cm	Standard	1	back	0.076
2437	6	2.4 GHz WLAN	10.70	10.71	Body	DSSS	1.5 cm	Standard	1	back	0.086
2437	6	2.4 GHz WLAN	10.70	10.93	Body	DSSS	1.5 cm	Standard	1	front	0.021
2412	1	2.4 GHz WLAN	12.89	12.70	Body	DSSS	1.5 cm	Standard	1	front	0.014
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram				

Notes:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001].
2. All modes of operation were investigated, and worst-case results are reported.
3. Batteries are fully charged for all readings.
4. Tissue parameters and temperatures are listed on the SAR plots.
5. Liquid tissue depth is was at least 15.0 cm.
Device was tested using a fixed spacing.
6. IEEE 802.11b mode was tested under 1 Mbps.
7. WLAN transmission was verified using a spectrum analyzer.
8. For 802.11 and other test reduction procedures, please refer to April TCB slides for methods followed. The highest average RF output power channel between 802.11 modes was ensured to have been tested.
9. Mid channel was additionally tested.

FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN	Page 44 of 52	

19 EQUIPMENT LIST



Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8648D	(9kHz-4GHz) Signal Generator	9/19/2009	Biennial	9/19/2011	3613A00315
Agilent	8753E	(30kHz-6GHz) Network Analyzer	3/31/2010	Annual	3/31/2011	JP38020182
Agilent	E5515C	Wireless Communications Test Set	9/10/2009	Annual	9/10/2010	GB46110872
Agilent	E5515C	Wireless Communications Test Set	9/11/2009	Annual	9/11/2010	GB46310798
Agilent	E5515C	Wireless Communications Test Set	8/25/2009	Annual	8/25/2010	GB41450275
Agilent	E8257D	(250kHz-20GHz) Signal Generator	3/30/2010	Annual	3/30/2011	MY45470194
SPEAG	D1900V2	1900 MHz SAR Dipole	1/20/2009	Biennial	1/20/2011	502
SPEAG	D2450V2	2450 MHz SAR Dipole	8/27/2009	Annual	8/27/2010	719
SPEAG	D2600V2	2600 MHz SAR Dipole	6/16/2010	Annual	6/16/2011	1004
SPEAG	D835V2	835 MHz SAR Dipole	1/19/2009	Biennial	1/19/2011	4d047
SPEAG	DAE3	Dasy Data Acquisition Electronics	9/17/2009	Annual	9/17/2010	455
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/22/2010	Annual	3/22/2011	704
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/21/2010	Annual	4/21/2011	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/22/2010	Annual	1/22/2011	649
SPEAG	ES3DV2	SAR Probe	9/18/2009	Annual	9/18/2010	3022
SPEAG	EX3DV4	SAR Probe	1/26/2010	Annual	1/26/2011	3550
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/21/2009	Annual	7/21/2010	859
SPEAG	D750V3	750 MHz Dipole	2/19/2009	Biennial	2/19/2011	1003
Speag	ES3DV3	SAR Probe	3/16/2010	Annual	3/16/2011	3213
Speag	ES3DV3	SAR Probe	4/20/2010	Annual	4/20/2011	3209
Rohde & Schwarz	SMIQ03B	Signal Generator	4/1/2010	Annual	4/1/2011	DE27259
Rohde & Schwarz	CMW500	LTE Base Station Simulator	8/25/2009	Annual	8/25/2010	100976
Anritsu	MA2481A	Power Sensor	12/2/2009	Annual	12/2/2010	5318
Anritsu	MA2481A	Power Sensor	12/3/2009	Annual	12/3/2010	5442
Anritsu	ML2438A	Power Meter	12/3/2009	Annual	12/3/2010	1190013
Anritsu	ML2438A	Power Meter	12/3/2009	Annual	12/3/2010	98150041
Agilent	8648D	Signal Generator	4/1/2010	Annual	4/1/2011	3629U00687
Anritsu	ML2438A	Power Meter	12/3/2009	Annual	12/3/2010	1070030
Anritsu	MA2481A	Power Sensor	12/2/2009	Annual	12/2/2010	5821
Anritsu	MA2481A	Power Sensor	12/3/2009	Annual	12/3/2010	8013
Anritsu	MA2481A	Power Sensor	12/3/2009	Annual	12/3/2010	2400
April	ALS-PR-DIEL	Dielectric Probe Kit	N/A		N/A	260-00959
Agilent	E5515C	Wireless Communications Tester	4/14/2010	Annual	4/14/2011	US41140256
Speag	ES3DV3	SAR Probe	2/10/2010	Annual	2/10/2011	3173

Notes:

Usage of SAR dipoles calibrated less than 2 years ago but more than 1 year ago were confirmed in maintaining return loss (< -20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB 450824:

D835V2 SN: 4d047		Parameters			
Date of Cal	Return Loss (dB)	Δ %	Impedance (Ω)	ΔΩ	
1/8/2007	-29.6	0.0%	52.6	0.0	
1/19/2009	-28.4	-4.1%	50.9	-1.7	

D1900V2 SN:502		Parameters			
Date of Cal	Return Loss (dB)	% change	Impedance (Ω)	ΔΩ	
1/23/2007	-26.8	0.0%	48.2	0.0	
1/20/2009	-26.8	0.0%	47.1	-1.1	



FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 45 of 52

20 CONCLUSION

20.1 Measurement Conclusion



The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC and Industry Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables. [3]



FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: 0Y1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN	Page 46 of 52	

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FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 47 of 52

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FCC ID: A3LSPHD700	 PCTEST ENGINEERING LABORATORY, INC.	SAR COMPLIANCE REPORT		Reviewed by: Quality Manager
Filename: OY1006171059-R7.A3L	Test Dates: 06/15/10 - 06/24/10	EUT Type: Cellular/PCS CDMA/EvDO Phone with WIMAX, Bluetooth and WLAN		Page 48 of 52

APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Brain Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.887 \text{ mho/m}$; $\epsilon_r = 41.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 06-15-2010; Ambient Temp: 22.6 °C; Tissue Temp: 21.5 °C

Probe: ES3DV3 - SN3213; ConvF(5.98, 5.98, 5.98); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: Cellular CDMA, Right Head, Touch, Mid.ch, Standard Battery

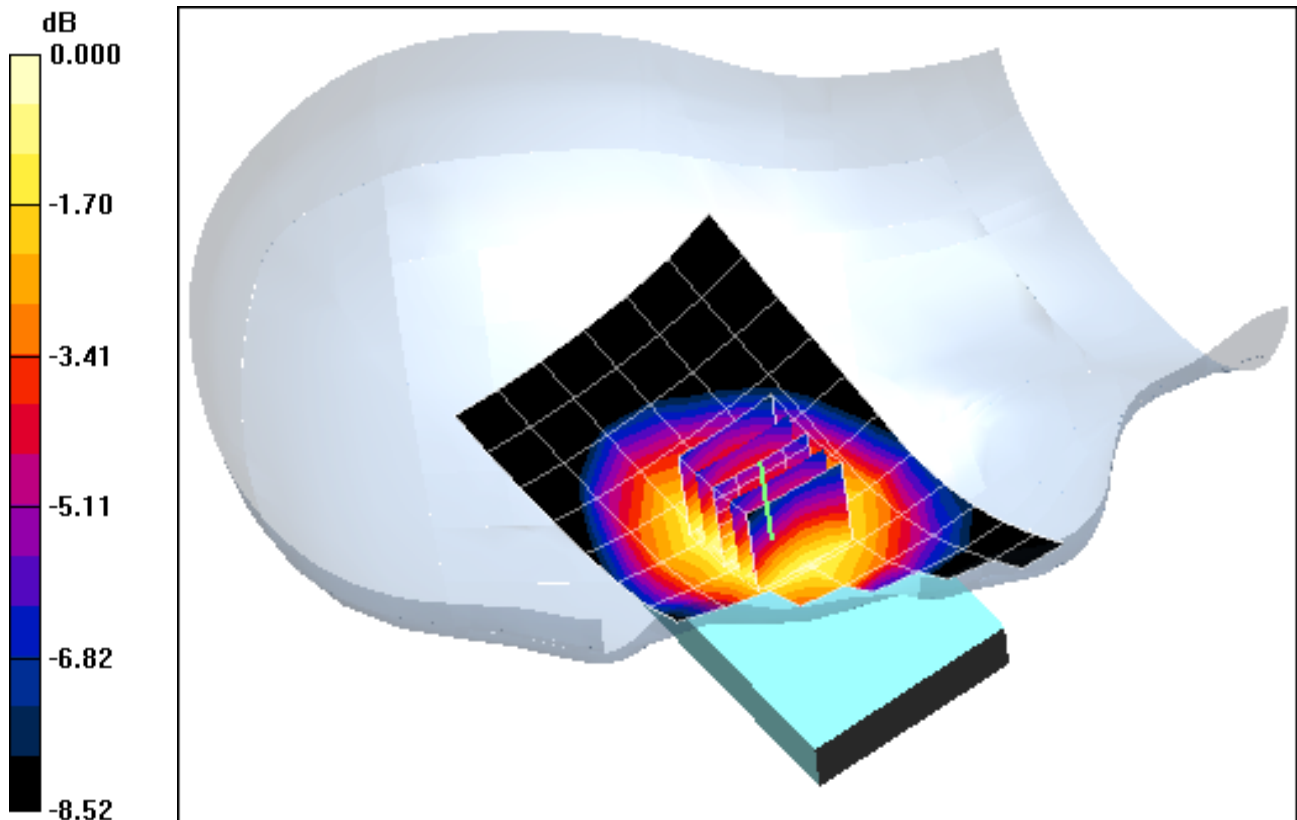
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 29.3 V/m; Power Drift = -0.072 dB

Peak SAR (extrapolated) = 0.816 W/kg

SAR(1 g) = 0.658 mW/g; SAR(10 g) = 0.510 mW/g



0 dB = 0.721mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Brain Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.887 \text{ mho/m}$; $\epsilon_r = 41.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 06-15-2010; Ambient Temp: 22.6 °C; Tissue Temp: 21.5 °C

Probe: ES3DV3 - SN3213; ConvF(5.98, 5.98, 5.98); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: Cellular CDMA, Right Head, Tilt, Mid.ch, Standard Battery

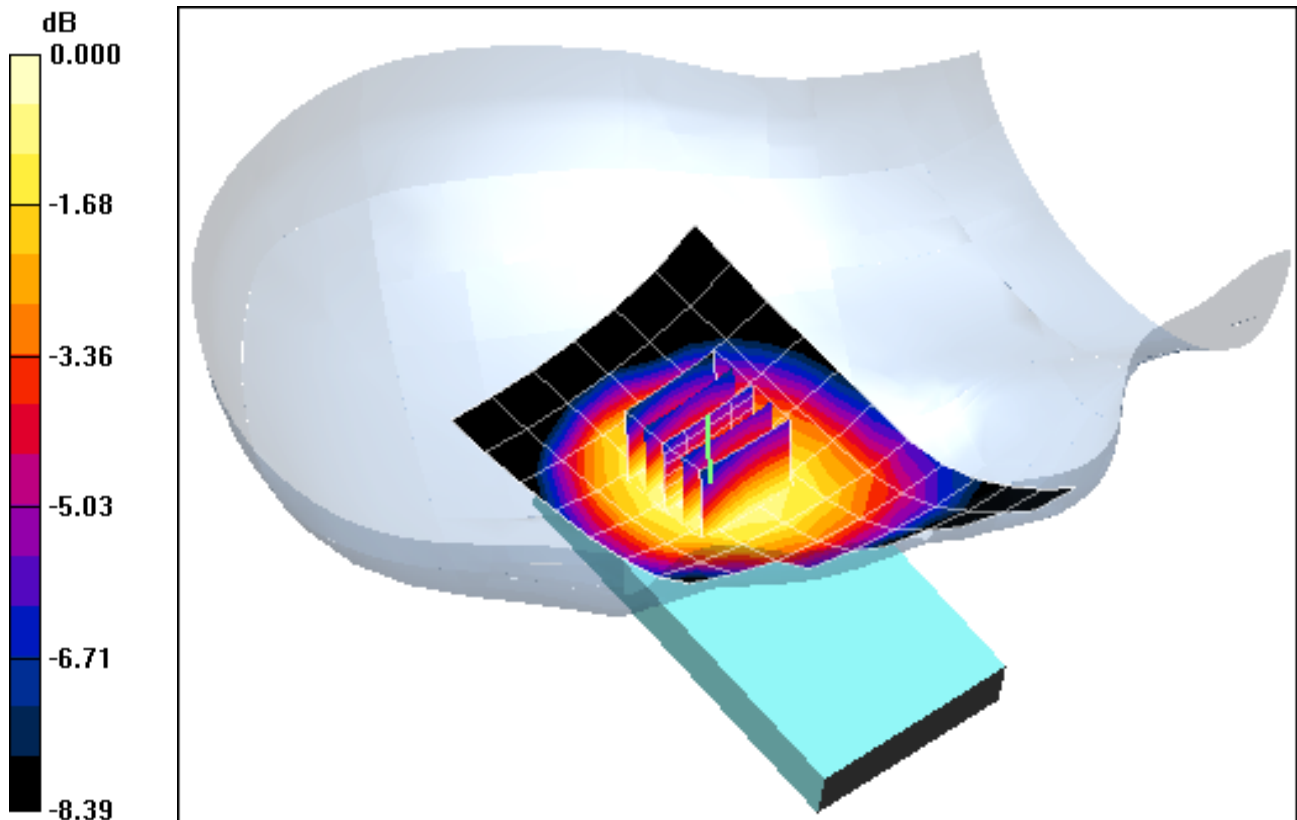
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 25.6 V/m; Power Drift = -0.036 dB

Peak SAR (extrapolated) = 0.622 W/kg

SAR(1 g) = 0.503 mW/g; SAR(10 g) = 0.387 mW/g



0 dB = 0.543mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Brain Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.887 \text{ mho/m}$; $\epsilon_r = 41.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 06-15-2010; Ambient Temp: 22.6 °C; Tissue Temp: 21.5 °C

Probe: ES3DV3 - SN3213; ConvF(5.98, 5.98, 5.98); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: Cellular CDMA, Left Head, Touch, Mid.ch, Standard Battery

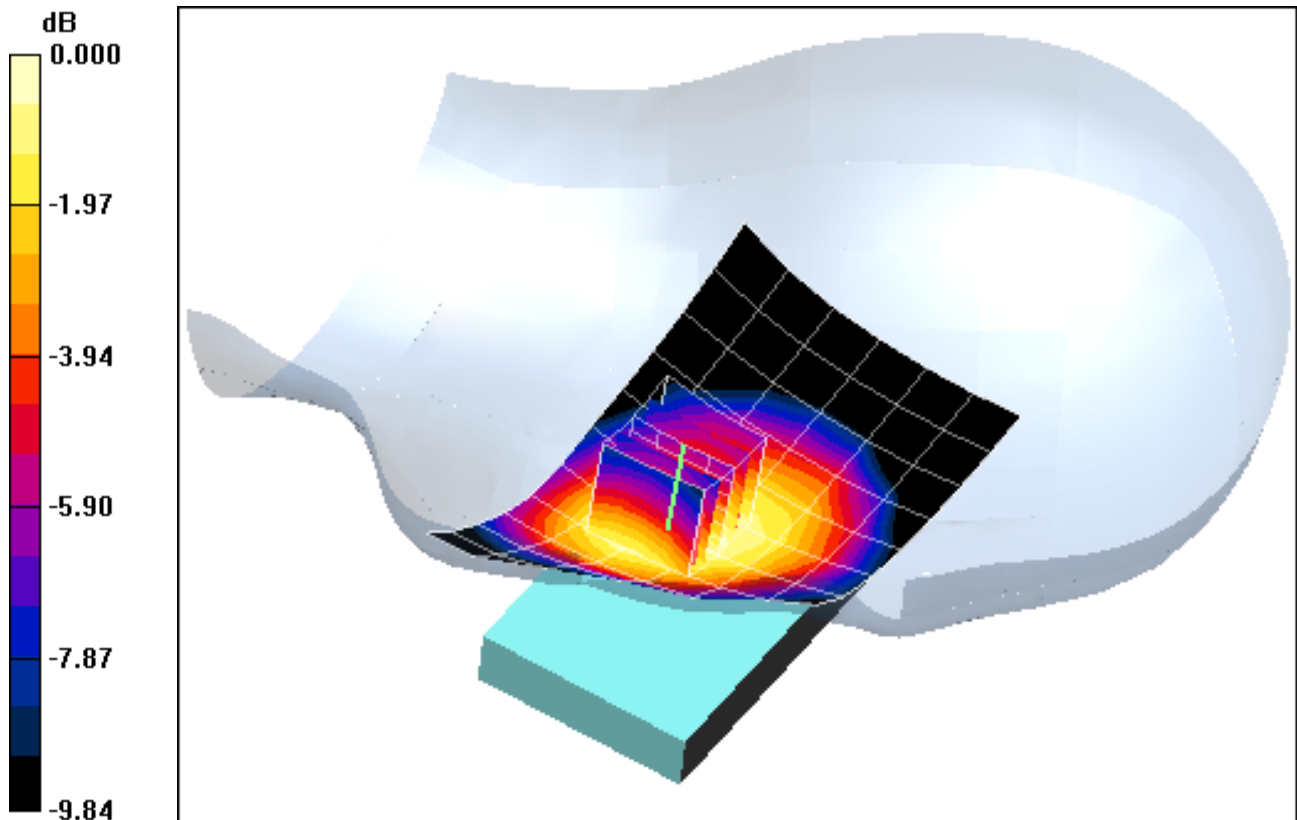
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.4 V/m; Power Drift = 0.272 dB

Peak SAR (extrapolated) = 0.874 W/kg

SAR(1 g) = 0.681 mW/g; SAR(10 g) = 0.515 mW/g



0 dB = 0.758mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Brain Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.887 \text{ mho/m}$; $\epsilon_r = 41.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 06-15-2010; Ambient Temp: 22.6 °C; Tissue Temp: 21.5 °C

Probe: ES3DV3 - SN3213; ConvF(5.98, 5.98, 5.98); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: Cellular CDMA, Left Head, Touch, Mid.ch, Standard Battery

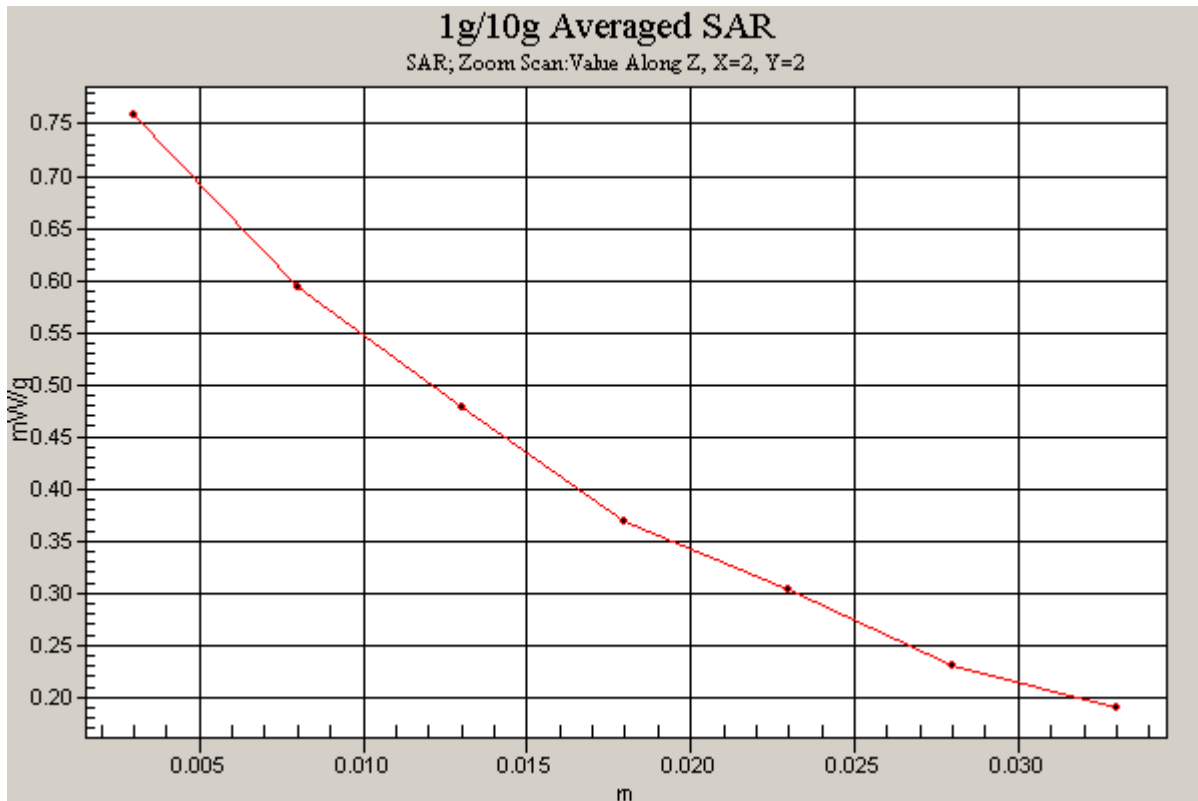
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.4 V/m; Power Drift = 0.272 dB

Peak SAR (extrapolated) = 0.874 W/kg

SAR(1 g) = 0.681 mW/g; SAR(10 g) = 0.515 mW/g



PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Brain Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.887 \text{ mho/m}$; $\epsilon_r = 41.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 06-15-2010; Ambient Temp: 22.6 °C; Tissue Temp: 21.5 °C

Probe: ES3DV3 - SN3213; ConvF(5.98, 5.98, 5.98); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: Cellular CDMA, Left Head, Tilt, Mid.ch, Standard Battery

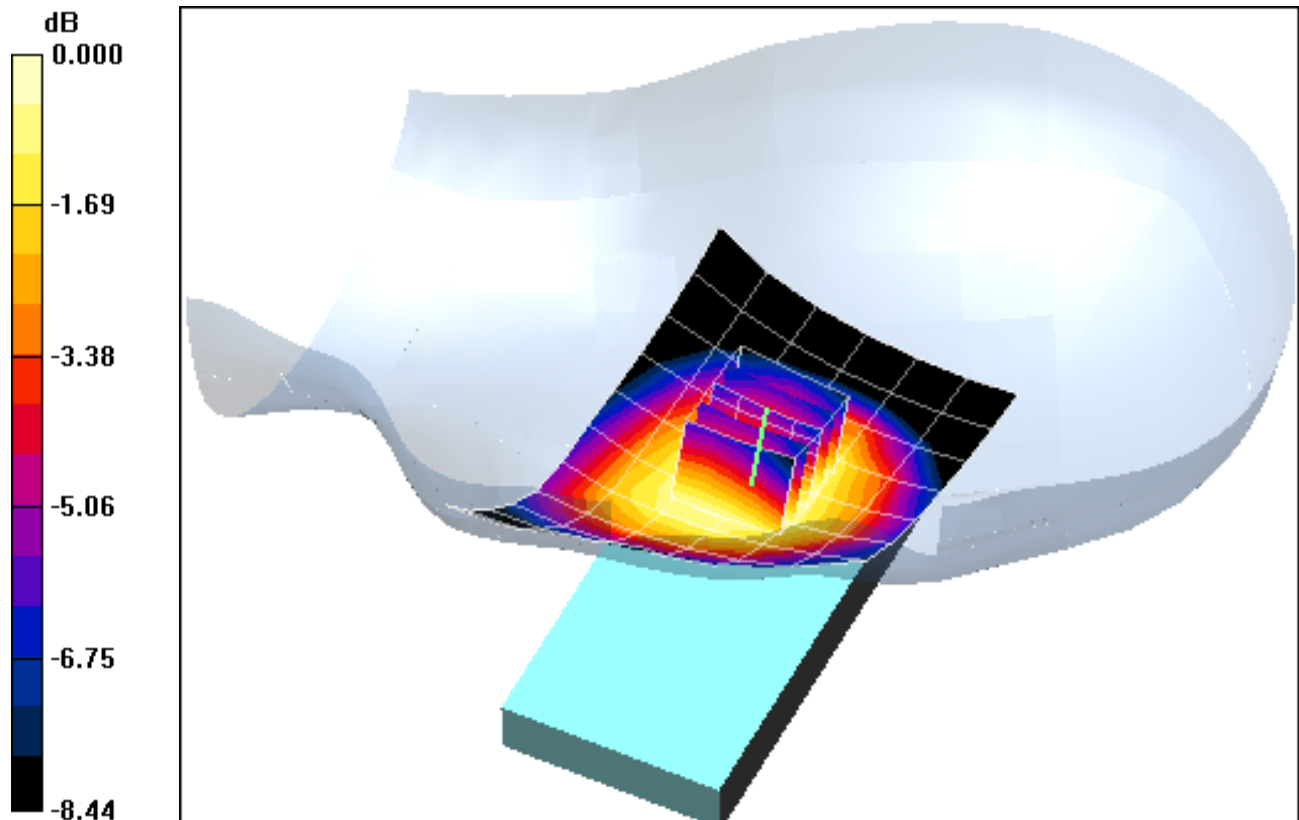
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 16.7 V/m; Power Drift = -0.065 dB

Peak SAR (extrapolated) = 0.576 W/kg

SAR(1 g) = 0.470 mW/g; SAR(10 g) = 0.365 mW/g



0 dB = 0.510mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Brain Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 40.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 06-15-2010; Ambient Temp: 23.5 °C; Tissue Temp: 21.8 °C

Probe: ES3DV3 - SN3213; ConvF(4.92, 4.92, 4.92); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: PCS CDMA, Right Head, Touch, Mid.ch, Standard Battery

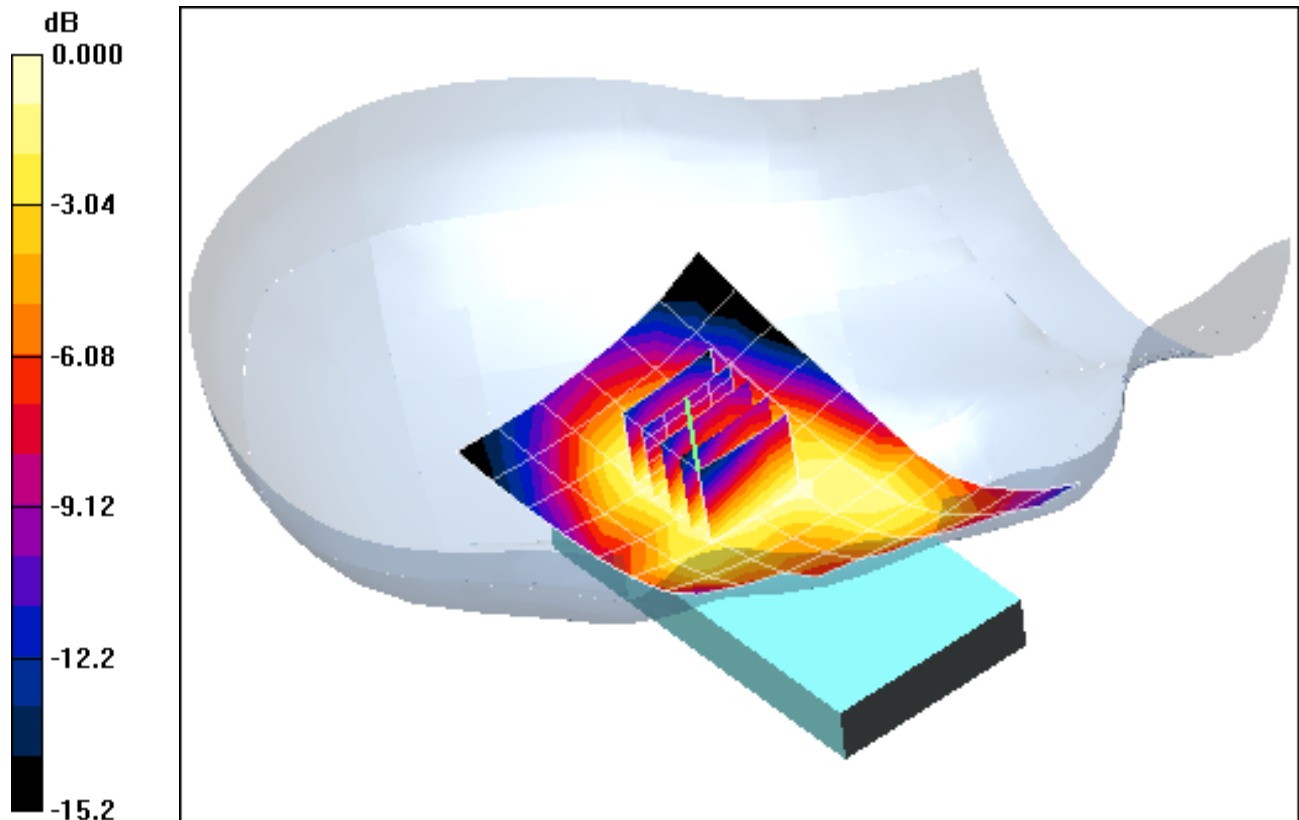
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.7 V/m; Power Drift = -0.008 dB

Peak SAR (extrapolated) = 0.419 W/kg

SAR(1 g) = 0.280 mW/g; SAR(10 g) = 0.186 mW/g



0 dB = 0.324mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Brain Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 40.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 06-15-2010; Ambient Temp: 23.5 °C; Tissue Temp: 21.8 °C

Probe: ES3DV3 - SN3213; ConvF(4.92, 4.92, 4.92); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: PCS CDMA, Right Head, Tilt, Mid.ch, Standard Battery

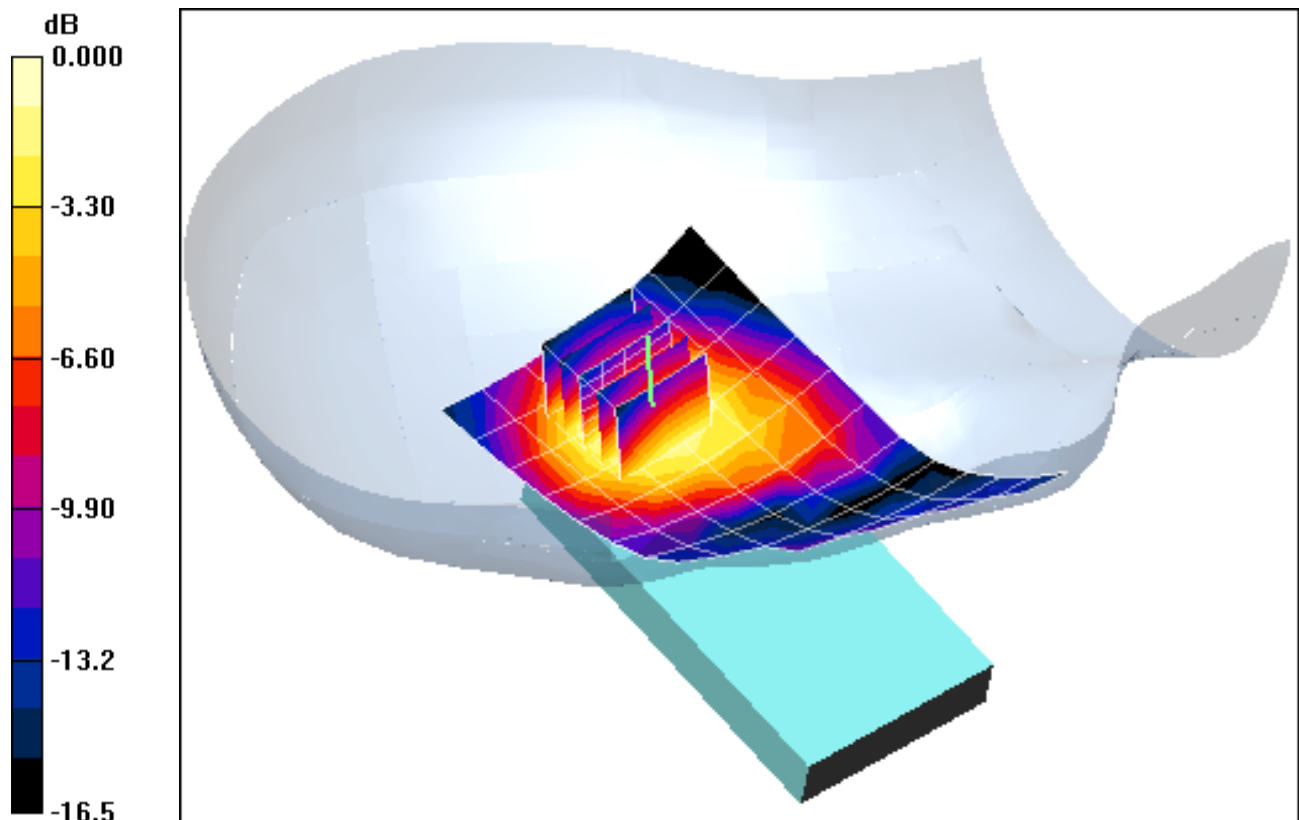
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.3 V/m; Power Drift = -0.222 dB

Peak SAR (extrapolated) = 0.674 W/kg

SAR(1 g) = 0.435 mW/g; SAR(10 g) = 0.265 mW/g



0 dB = 0.502mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Brain Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 40.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 06-15-2010; Ambient Temp: 23.5 °C; Tissue Temp: 21.8 °C

Probe: ES3DV3 - SN3213; ConvF(4.92, 4.92, 4.92); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: PCS CDMA, Left Head, Touch, Mid.ch, Standard Battery

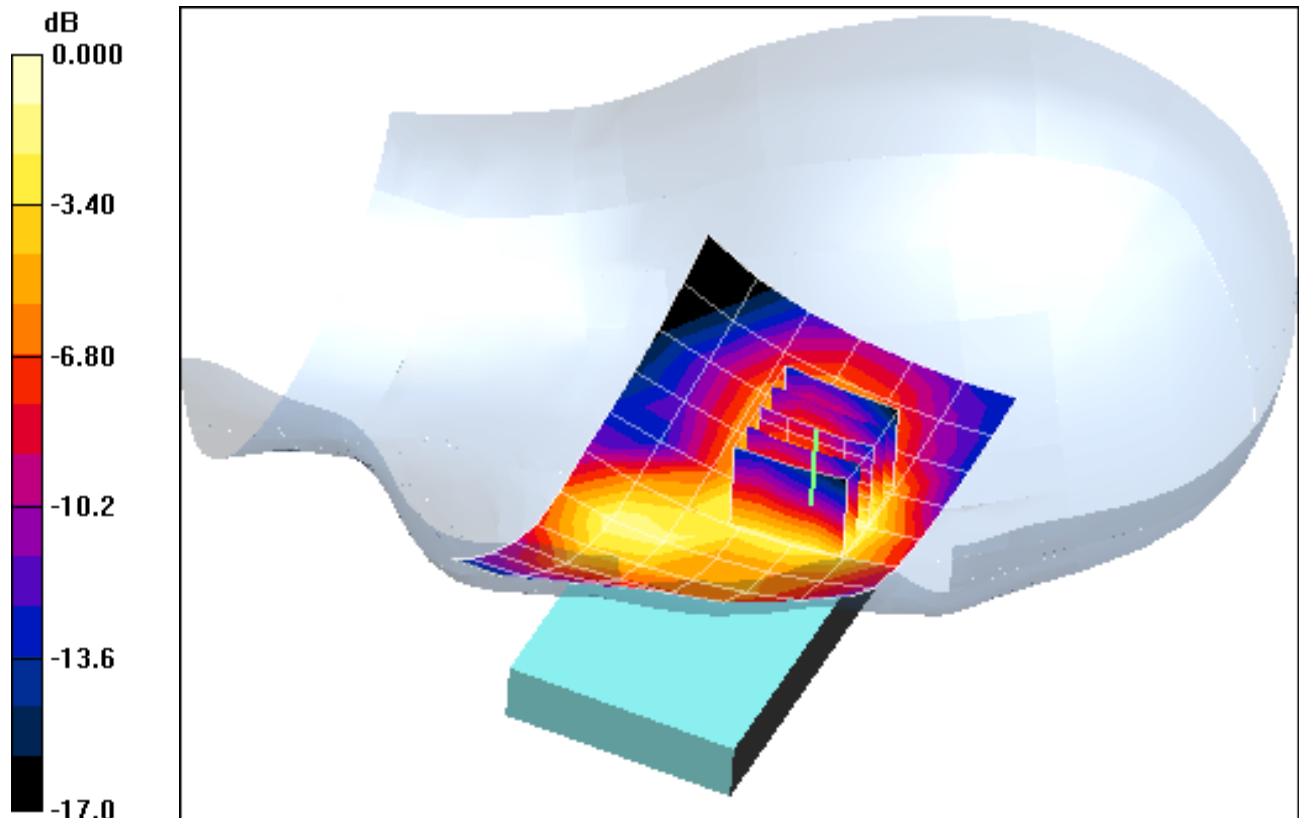
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.1 V/m; Power Drift = -0.181 dB

Peak SAR (extrapolated) = 0.628 W/kg

SAR(1 g) = 0.426 mW/g; SAR(10 g) = 0.264 mW/g



0 dB = 0.487mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Brain Medium parameters used:

$$f = 1880 \text{ MHz}; \sigma = 1.44 \text{ mho/m}; \epsilon_r = 40.1; \rho = 1000 \text{ kg/m}^3$$

Phantom section: Left Section

Test Date: 06-15-2010; Ambient Temp: 23.5 °C; Tissue Temp: 21.8 °C

Probe: ES3DV3 - SN3213; ConvF(4.92, 4.92, 4.92); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: PCS CDMA, Left Head, Touch, Mid.ch, Standard Battery

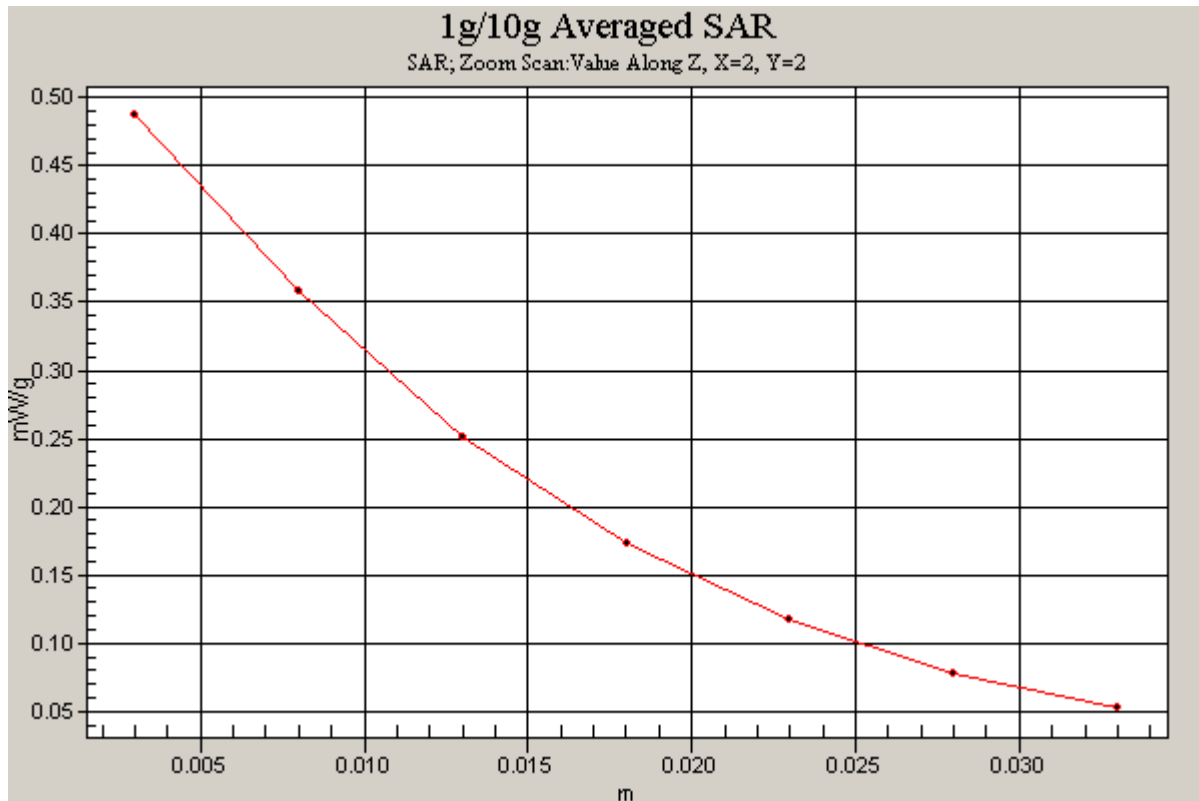
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.1 V/m; Power Drift = -0.181 dB

Peak SAR (extrapolated) = 0.628 W/kg

SAR(1 g) = 0.426 mW/g; SAR(10 g) = 0.264 mW/g



PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Brain Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 40.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 06-15-2010; Ambient Temp: 23.5 °C; Tissue Temp: 21.8 °C

Probe: ES3DV3 - SN3213; ConvF(4.92, 4.92, 4.92); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: PCS CDMA, Left Head, Tilt, Mid.ch, Standard Battery

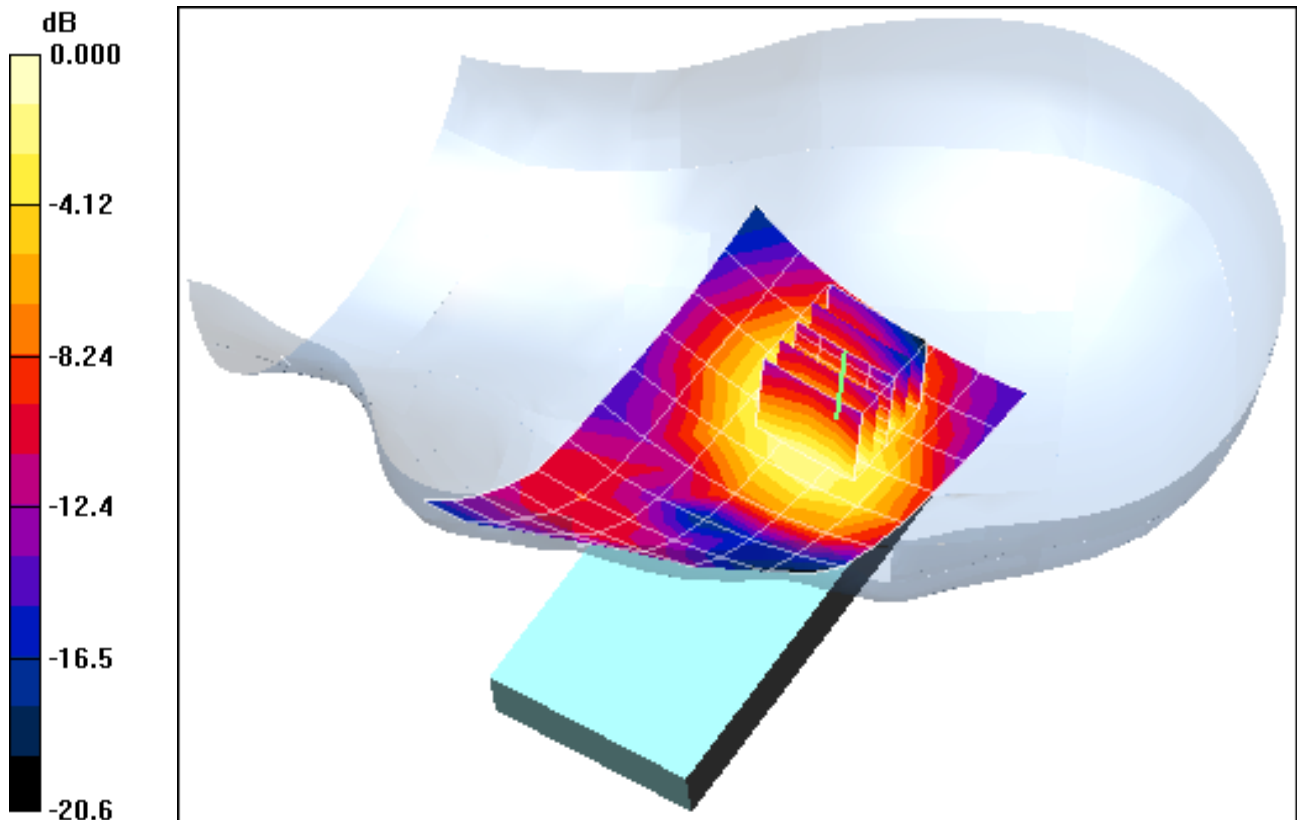
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 17.0 V/m; Power Drift = 0.121 dB

Peak SAR (extrapolated) = 0.614 W/kg

SAR(1 g) = 0.385 mW/g; SAR(10 g) = 0.237 mW/g



0 dB = 0.453mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: WiMAX RF; Frequency: 2501 MHz; Duty Cycle: 1:2.7
Medium: 2600 Brain Medium parameters used (interpolated):

$$f = 2501 \text{ MHz}; \sigma = 1.9 \text{ mho/m}; \epsilon_r = 39.4; \rho = 1000 \text{ kg/m}^3$$

Phantom section: Right Section

Test Date: 07-19-2010; Ambient Temp: 24.7 °C; Tissue Temp: 22.9 °C

Probe: ES3DV3 - SN3173; ConvF(4.31, 4.31, 4.31); Calibrated: 2/10/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/21/2010

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: WIMAX, Right Head, Touch, Low.ch, BAMC2*3_QPSK1/2, 5 Mhz BW

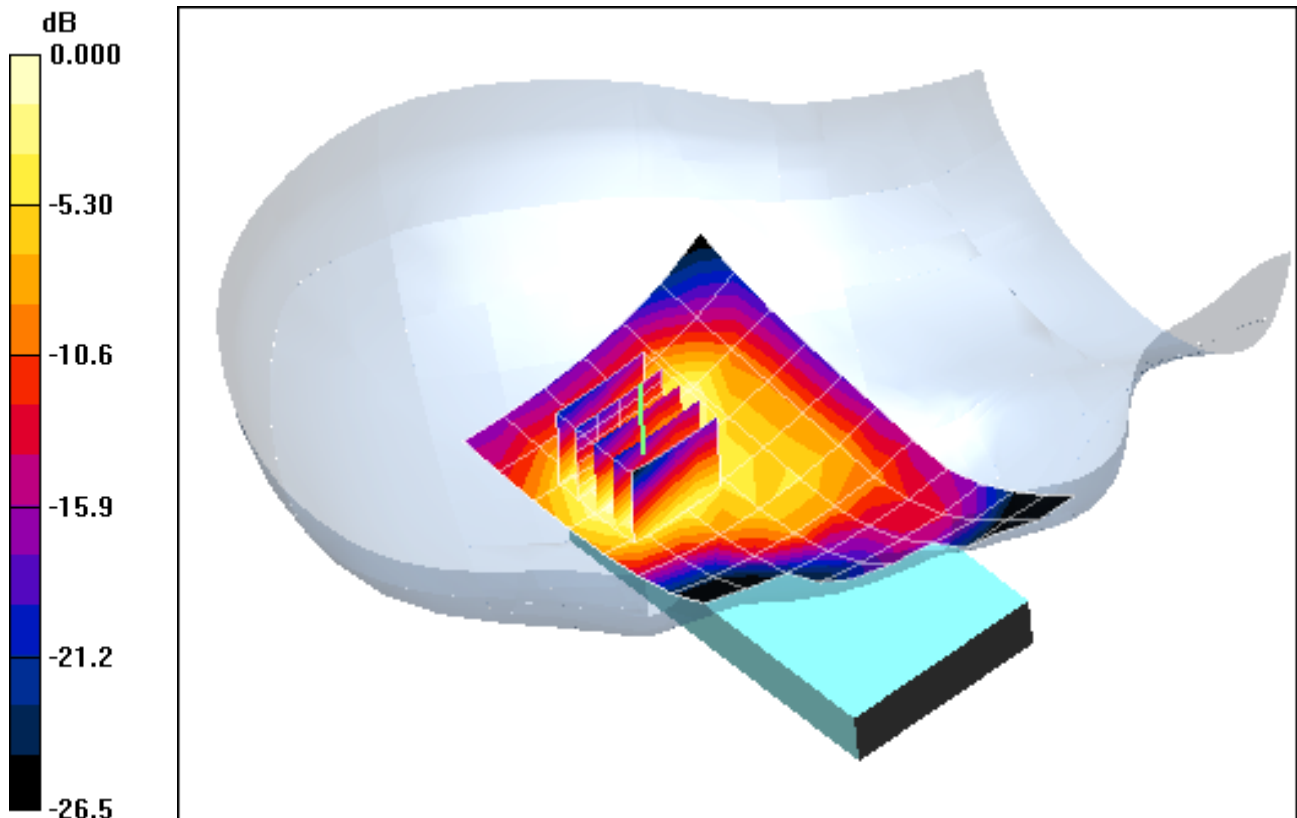
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.0 V/m; Power Drift = -0.064 dB

Peak SAR (extrapolated) = 0.770 W/kg

SAR(1 g) = 0.401 mW/g; SAR(10 g) = 0.225 mW/g



0 dB = 0.495mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: WiMAX RF; Frequency: 2501 MHz; Duty Cycle: 1:2.7
Medium: 2600 Brain Medium parameters used (interpolated):

$$f = 2501 \text{ MHz}; \sigma = 1.9 \text{ mho/m}; \epsilon_r = 39.4; \rho = 1000 \text{ kg/m}^3$$

Phantom section: Right Section

Test Date: 07-19-2010; Ambient Temp: 24.7 °C; Tissue Temp: 22.9 °C

Probe: ES3DV3 - SN3173; ConvF(4.31, 4.31, 4.31); Calibrated: 2/10/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/21/2010

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: WIMAX, Right Head, Touch, Low.ch, BAMC2*3_QPSK1/2, 5 Mhz BW

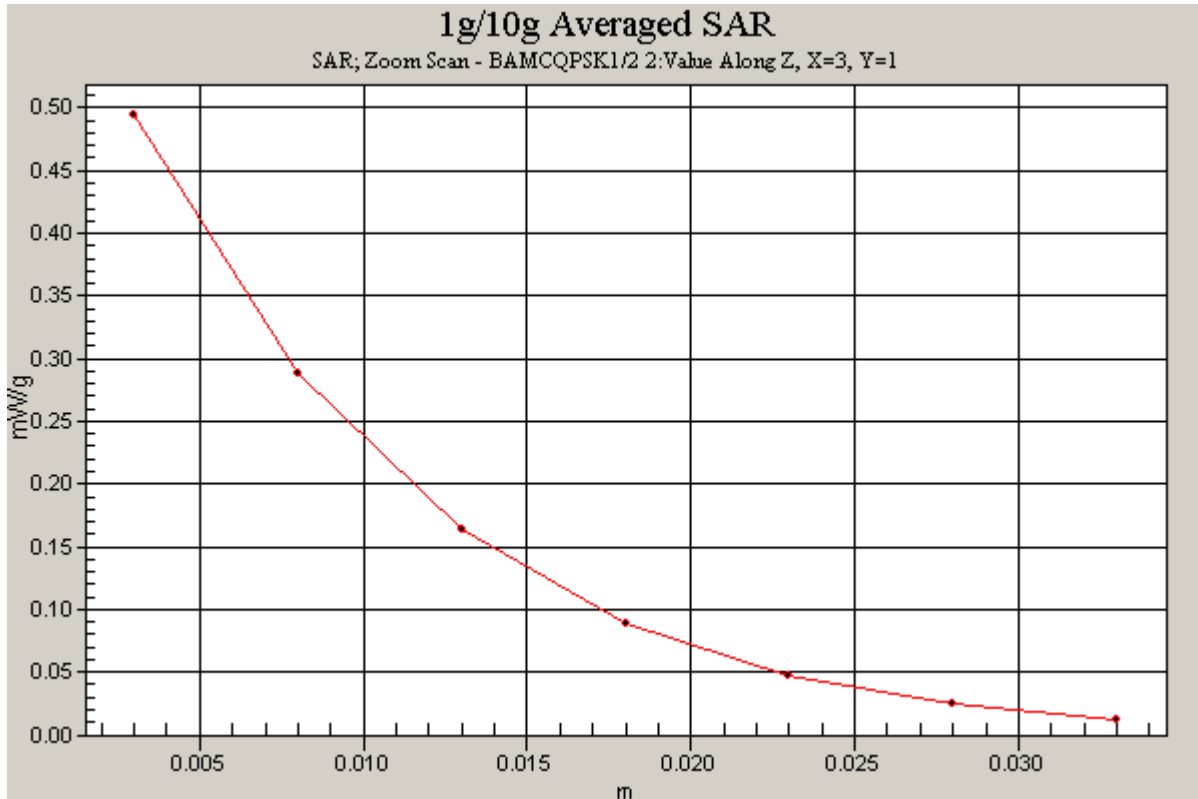
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.0 V/m; Power Drift = -0.064 dB

Peak SAR (extrapolated) = 0.770 W/kg

SAR(1 g) = 0.401 mW/g; SAR(10 g) = 0.225 mW/g



PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: WiMAX RF; Frequency: 2501 MHz; Duty Cycle: 1:2.7
Medium: 2600 Brain Medium parameters used (interpolated):

$f = 2501 \text{ MHz}$; $\sigma = 1.9 \text{ mho/m}$; $\epsilon_r = 39.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 07-19-2010; Ambient Temp: 24.7 °C; Tissue Temp: 22.9 °C

Probe: ES3DV3 - SN3173; ConvF(4.31, 4.31, 4.31); Calibrated: 2/10/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/21/2010

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: WIMAX, Right Head, Touch, Low.ch, PUSC_QPSK1/2, 5 Mhz BW

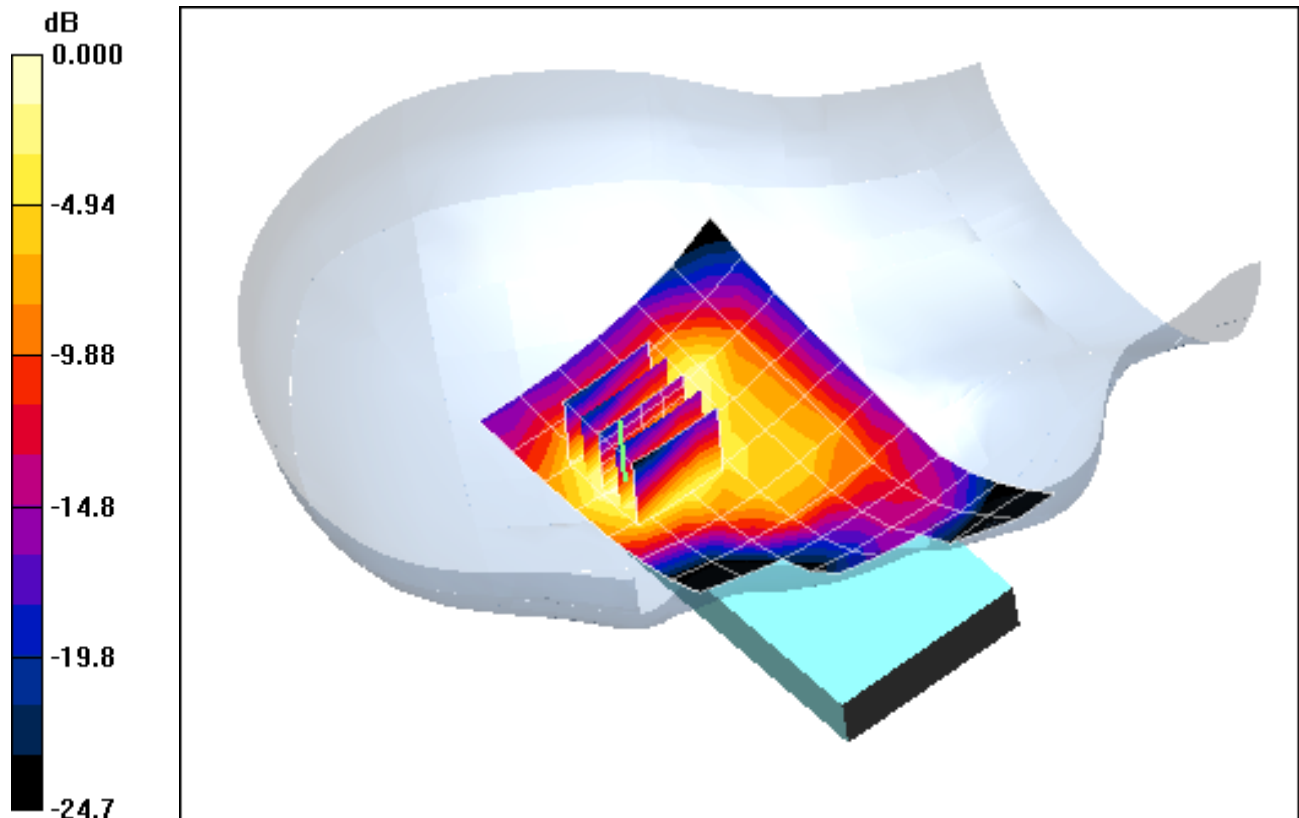
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.6 V/m; Power Drift = 0.110 dB

Peak SAR (extrapolated) = 0.756 W/kg

SAR(1 g) = 0.382 mW/g; SAR(10 g) = 0.217 mW/g



0 dB = 0.479mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: WiMAX RF; Frequency: 2501 MHz; Duty Cycle: 1:2.7
Medium: 2600 Brain Medium parameters used (interpolated):

$f = 2501 \text{ MHz}$; $\sigma = 1.9 \text{ mho/m}$; $\epsilon_r = 39.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 07-19-2010; Ambient Temp: 24.7 °C; Tissue Temp: 22.9 °C

Probe: ES3DV3 - SN3173; ConvF(4.31, 4.31, 4.31); Calibrated: 2/10/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/21/2010

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: WIMAX, Right Head, Tilt, Low.ch, BAMC2*3_16QAM1/2, 5 Mhz BW

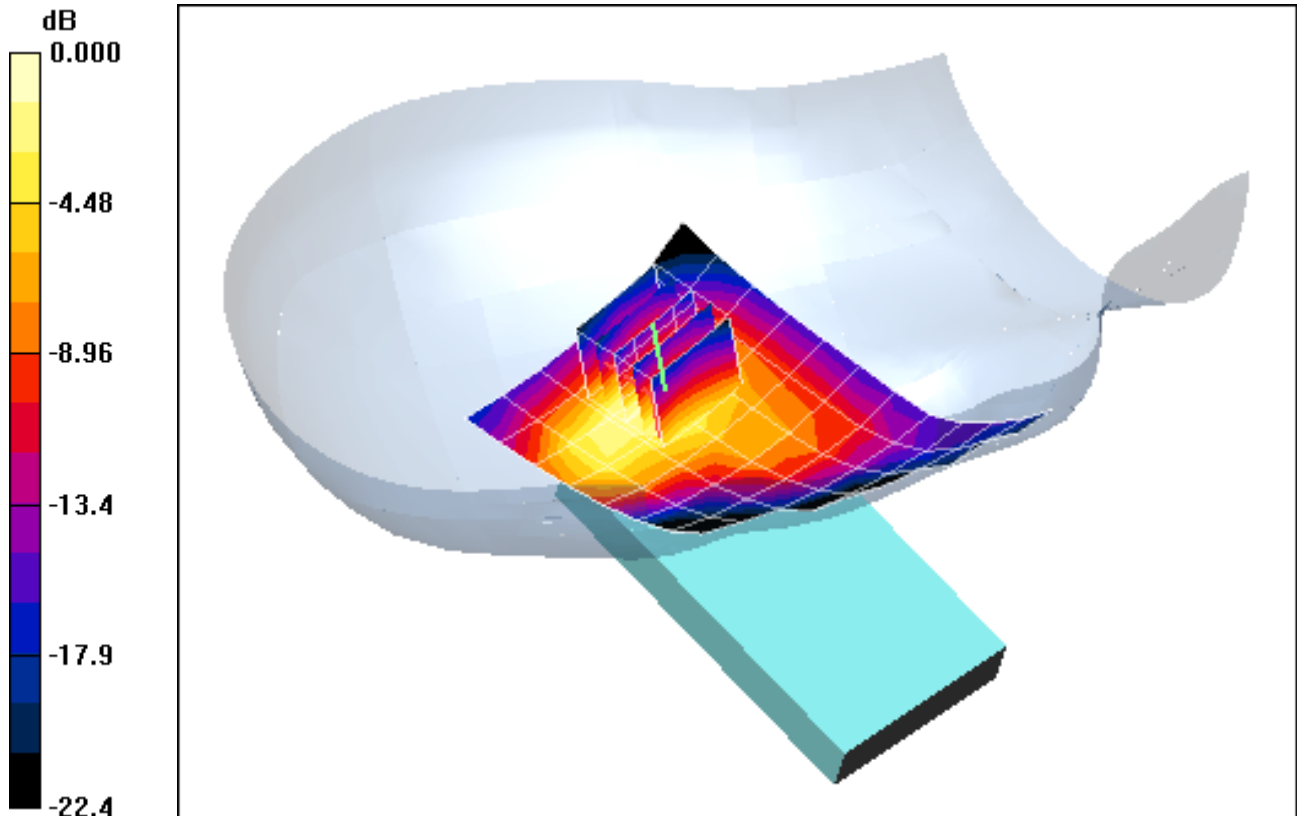
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.2 V/m; Power Drift = -0.012 dB

Peak SAR (extrapolated) = 0.658 W/kg

SAR(1 g) = 0.368 mW/g; SAR(10 g) = 0.194 mW/g



0 dB = 0.456mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: WiMAX RF; Frequency: 2501 MHz; Duty Cycle: 1:2.7
Medium: 2600 Brain Medium parameters used (interpolated):

$$f = 2501 \text{ MHz}; \sigma = 1.9 \text{ mho/m}; \epsilon_r = 39.4; \rho = 1000 \text{ kg/m}^3$$

Phantom section: Right Section

Test Date: 07-19-2010; Ambient Temp: 24.7 °C; Tissue Temp: 22.9 °C

Probe: ES3DV3 - SN3173; ConvF(4.31, 4.31, 4.31); Calibrated: 2/10/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/21/2010

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: WIMAX, Right Head, Tilt, Low.ch, PUSC_16QAM1/2, 5 Mhz BW

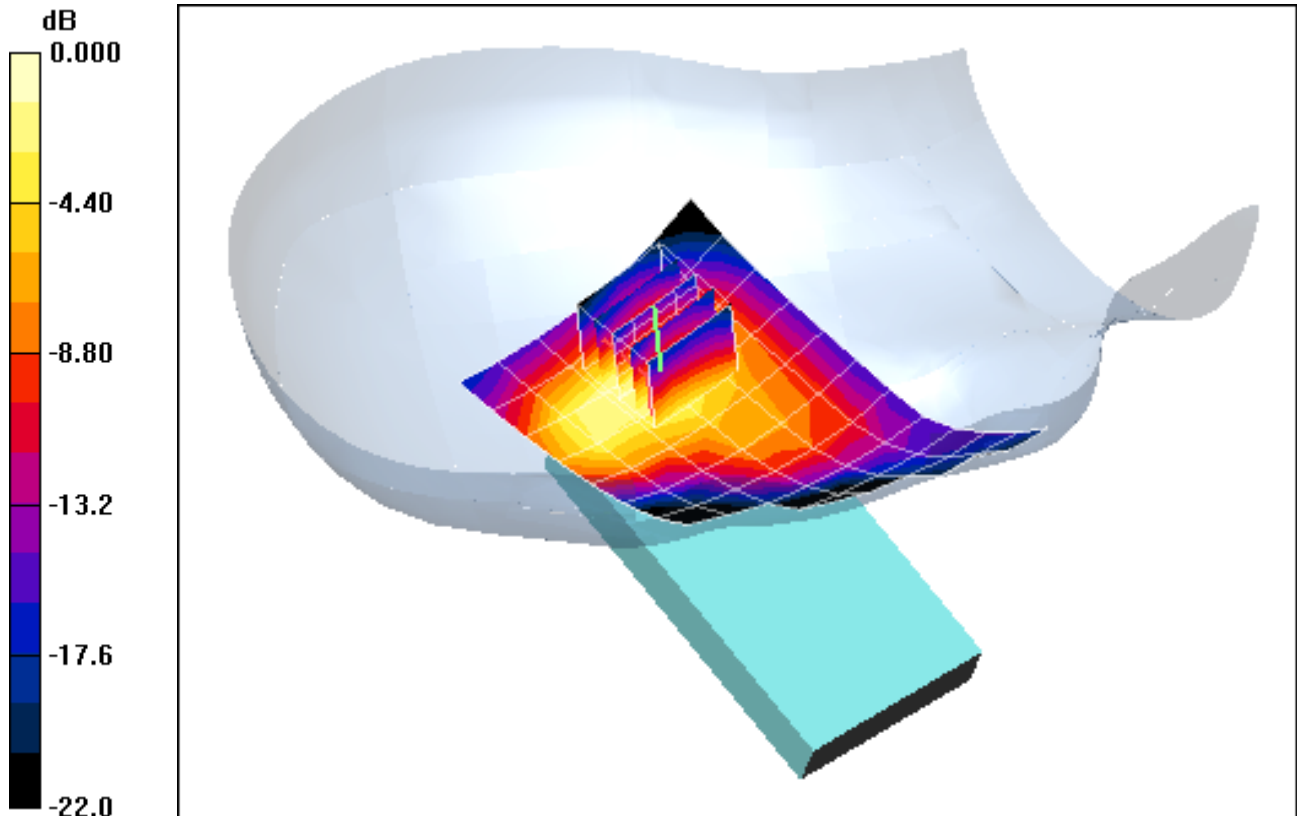
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.5 V/m; Power Drift = 0.033 dB

Peak SAR (extrapolated) = 0.610 W/kg

SAR(1 g) = 0.341 mW/g; SAR(10 g) = 0.180 mW/g



0 dB = 0.426mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: WiMAX RF; Frequency: 2600 MHz; Duty Cycle: 1:2.7

Medium: 2600 Brain Medium parameters used:

$f = 2600 \text{ MHz}$; $\sigma = 2.01 \text{ mho/m}$; $\epsilon_r = 39$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 07-19-2010; Ambient Temp: 24.7 °C; Tissue Temp: 22.9 °C

Probe: ES3DV3 - SN3173; ConvF(4.31, 4.31, 4.31); Calibrated: 2/10/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/21/2010

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: WIMAX, Left Head, Touch, Mid.ch, BAMC2*3_16QAM1/2, 5MHz BW

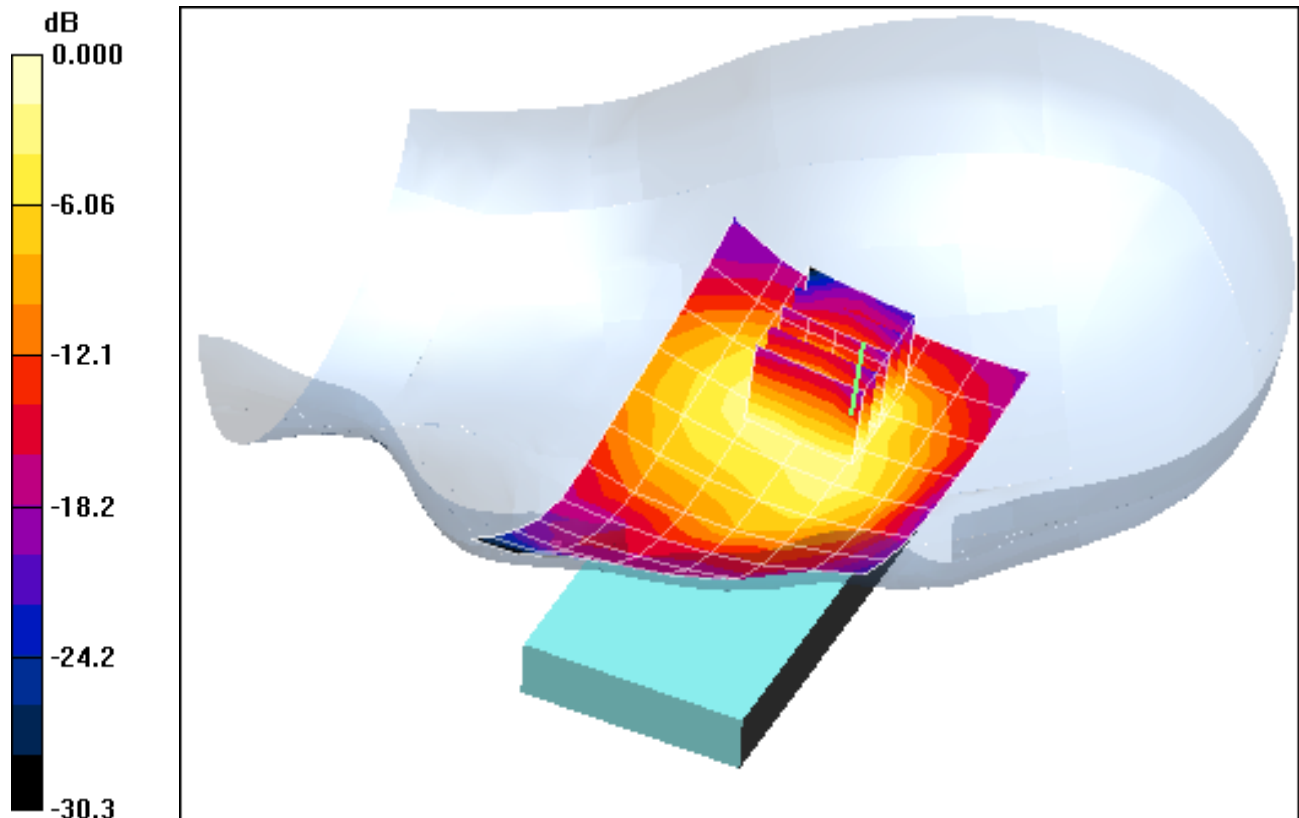
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.8 V/m; Power Drift = 0.032 dB

Peak SAR (extrapolated) = 0.610 W/kg

SAR(1 g) = 0.326 mW/g; SAR(10 g) = 0.171 mW/g



0 dB = 0.422mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: WiMAX RF; Frequency: 2600 MHz; Duty Cycle: 1:2.7

Medium: 2600 Brain Medium parameters used:

$f = 2600 \text{ MHz}$; $\sigma = 2.01 \text{ mho/m}$; $\epsilon_r = 39$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 07-19-2010; Ambient Temp: 24.7 °C; Tissue Temp: 22.9 °C

Probe: ES3DV3 - SN3173; ConvF(4.31, 4.31, 4.31); Calibrated: 2/10/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/21/2010

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: WIMAX, Left Head, Touch, Mid.ch, PUSC_16QAM1/2, 5MHz BW

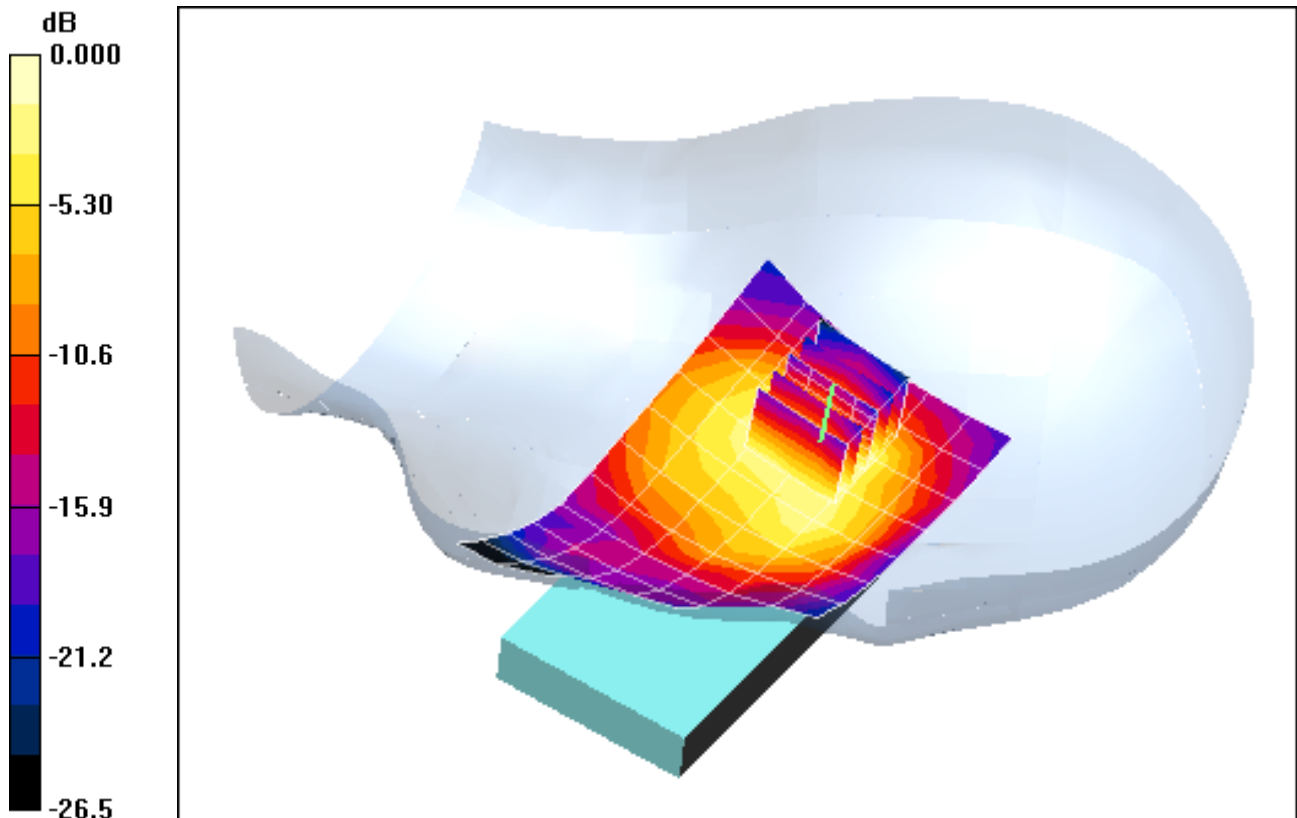
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.3 V/m; Power Drift = 0.026 dB

Peak SAR (extrapolated) = 0.571 W/kg

SAR(1 g) = 0.308 mW/g; SAR(10 g) = 0.162 mW/g



0 dB = 0.396mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: WiMAX RF; Frequency: 2600 MHz; Duty Cycle: 1:2.7

Medium: 2600 Brain Medium parameters used:

$f = 2600 \text{ MHz}$; $\sigma = 2.01 \text{ mho/m}$; $\epsilon_r = 39$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 07-19-2010; Ambient Temp: 24.7 °C; Tissue Temp: 22.9 °C

Probe: ES3DV3 - SN3173; ConvF(4.31, 4.31, 4.31); Calibrated: 2/10/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/21/2010

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: WIMAX, Left Head, Tilt, Mid.ch, BAMC2*3_QPSK1/2, 5MHz BW

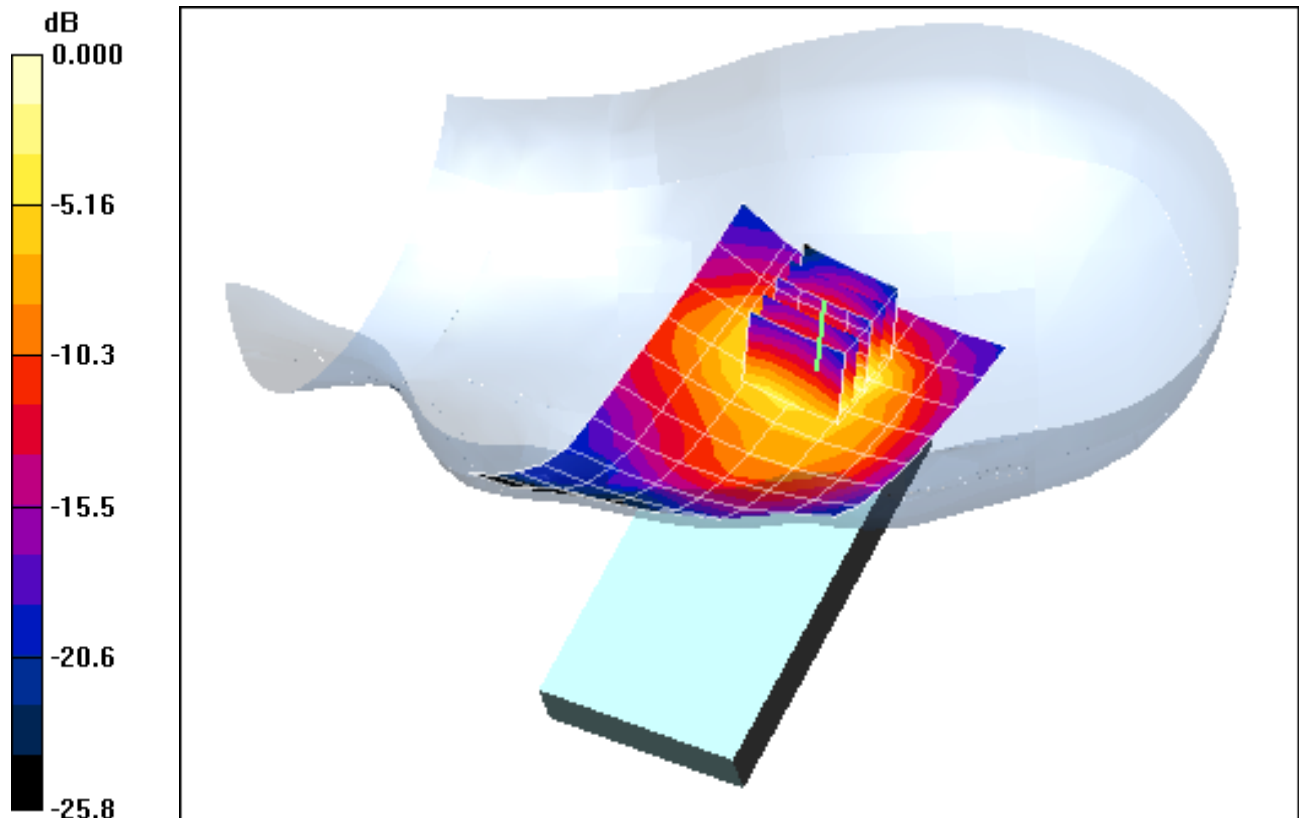
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.6 V/m; Power Drift = 0.027 dB

Peak SAR (extrapolated) = 0.631 W/kg

SAR(1 g) = 0.340 mW/g; SAR(10 g) = 0.168 mW/g



0 dB = 0.437mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: WiMAX RF; Frequency: 2600 MHz; Duty Cycle: 1:2.7

Medium: 2600 Brain Medium parameters used:

$f = 2600 \text{ MHz}$; $\sigma = 2.01 \text{ mho/m}$; $\epsilon_r = 39$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 07-19-2010; Ambient Temp: 24.7 °C; Tissue Temp: 22.9 °C

Probe: ES3DV3 - SN3173; ConvF(4.31, 4.31, 4.31); Calibrated: 2/10/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/21/2010

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: WIMAX, Left Head, Tilt, Mid.ch, PUSC_QPSK1/2, 5MHz BW

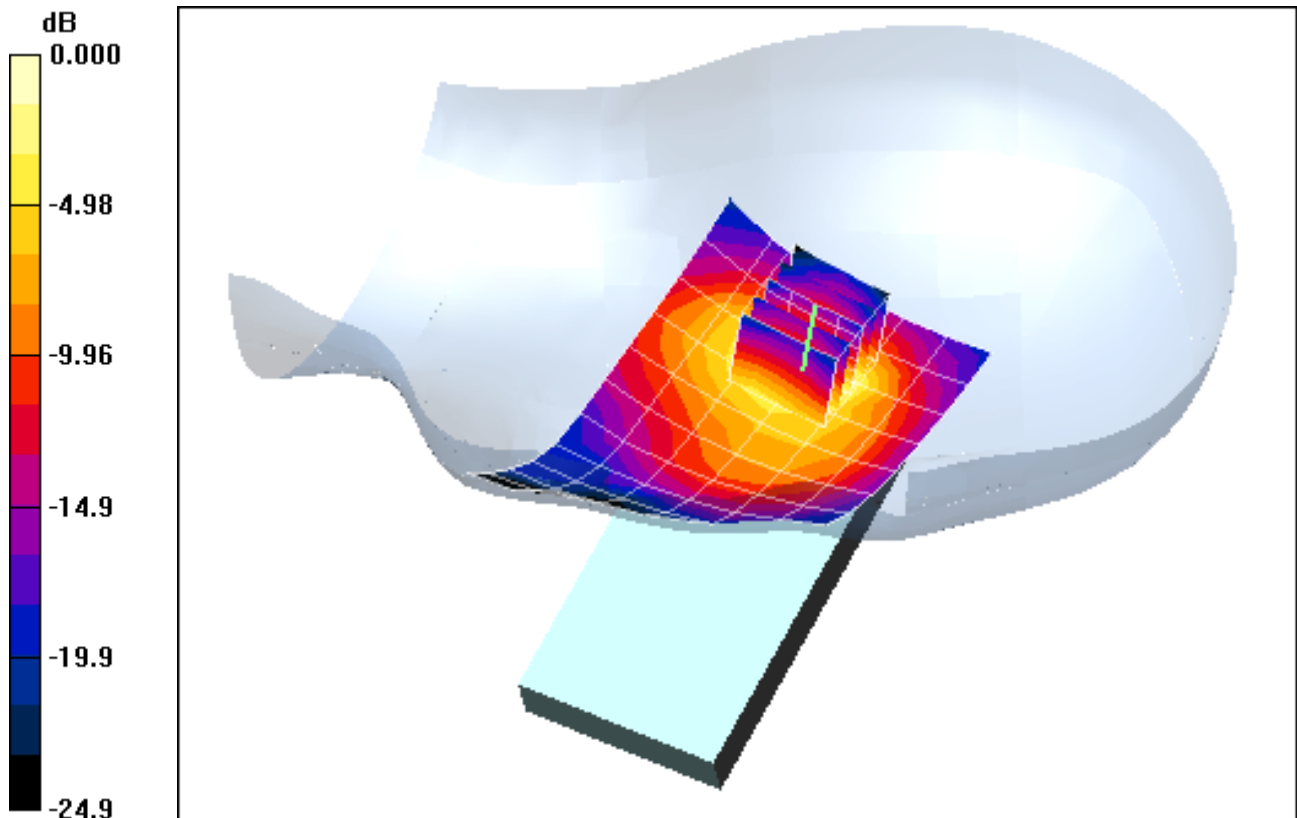
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.0 V/m; Power Drift = 0.033 dB

Peak SAR (extrapolated) = 0.584 W/kg

SAR(1 g) = 0.314 mW/g; SAR(10 g) = 0.155 mW/g



0 dB = 0.406mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Brain Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$; $\sigma = 1.74 \text{ mho/m}$; $\epsilon_r = 38.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 06-16-2010; Ambient Temp: 22.7 °C; Tissue Temp: 21.5 °C

Probe: ES3DV3 - SN3213; ConvF(4.36, 4.36, 4.36); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: IEEE 802.11b, Right Head, Touch, Ch 06, 1 Mbps

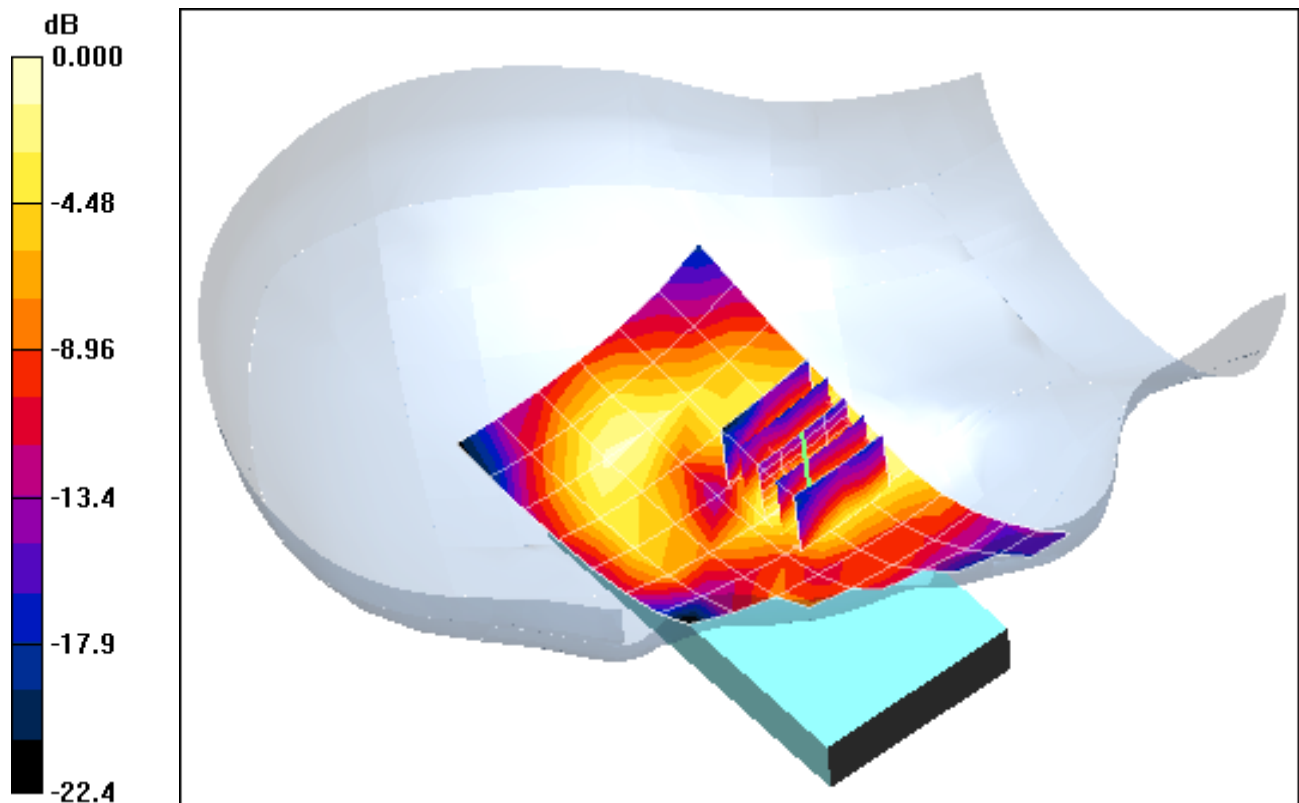
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.25 V/m; Power Drift = 0.013 dB

Peak SAR (extrapolated) = 0.122 W/kg

SAR(1 g) = 0.067 mW/g; SAR(10 g) = 0.036 mW/g



0 dB = 0.083mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Brain Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$; $\sigma = 1.74 \text{ mho/m}$; $\epsilon_r = 38.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 06-16-2010; Ambient Temp: 22.7 °C; Tissue Temp: 21.5 °C

Probe: ES3DV3 - SN3213; ConvF(4.36, 4.36, 4.36); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: IEEE 802.11b, Right Head, Tilt, Ch 06, 1 Mbps

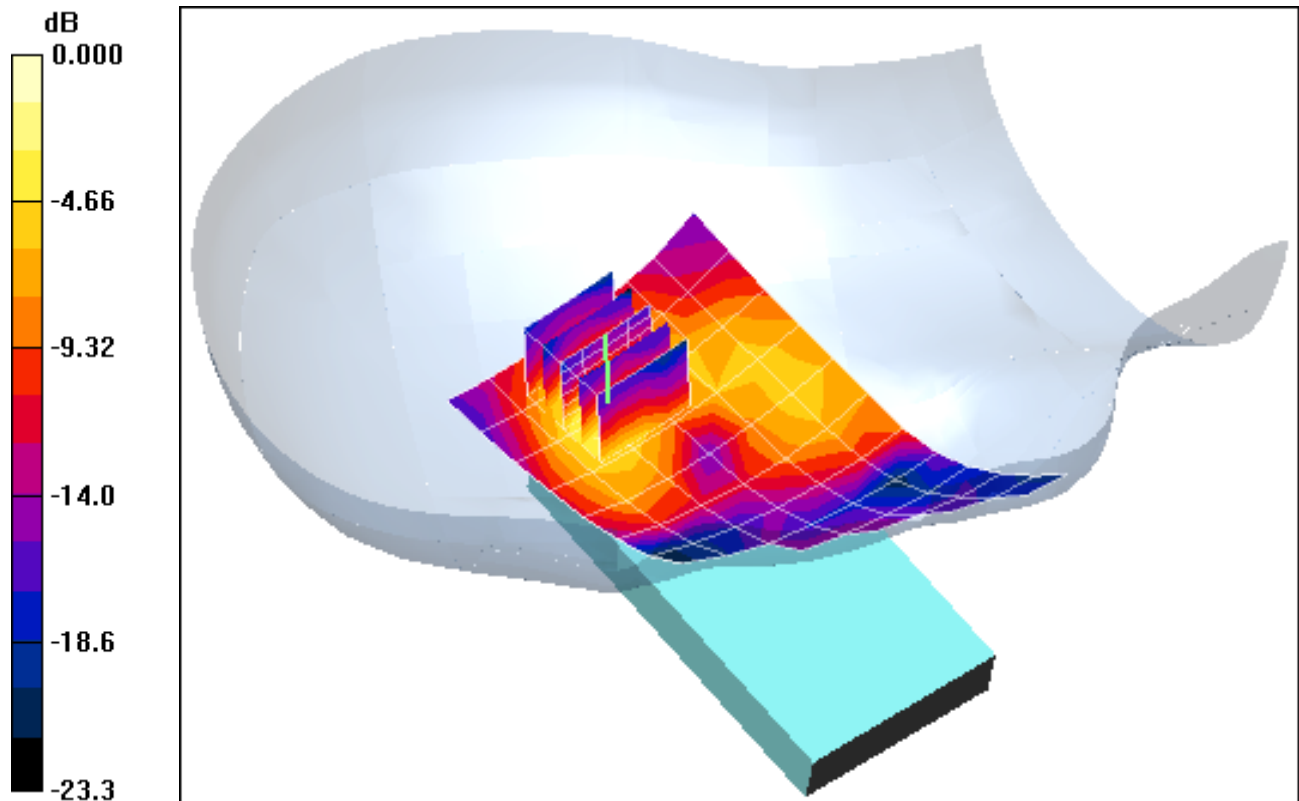
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.65 V/m; Power Drift = 0.033 dB

Peak SAR (extrapolated) = 0.159 W/kg

SAR(1 g) = 0.080 mW/g; SAR(10 g) = 0.037 mW/g



0 dB = 0.105mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: 2450 Brain Medium parameters used (interpolated):

$f = 2412 \text{ MHz}$; $\sigma = 1.71 \text{ mho/m}$; $\epsilon_r = 38.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 06-24-2010; Ambient Temp: 23.3 °C; Tissue Temp: 21.6 °C

Probe: ES3DV3 - SN3213; ConvF(4.36, 4.36, 4.36); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: IEEE 802.11b, Left Head, Touch, Ch 01, 1 Mbps

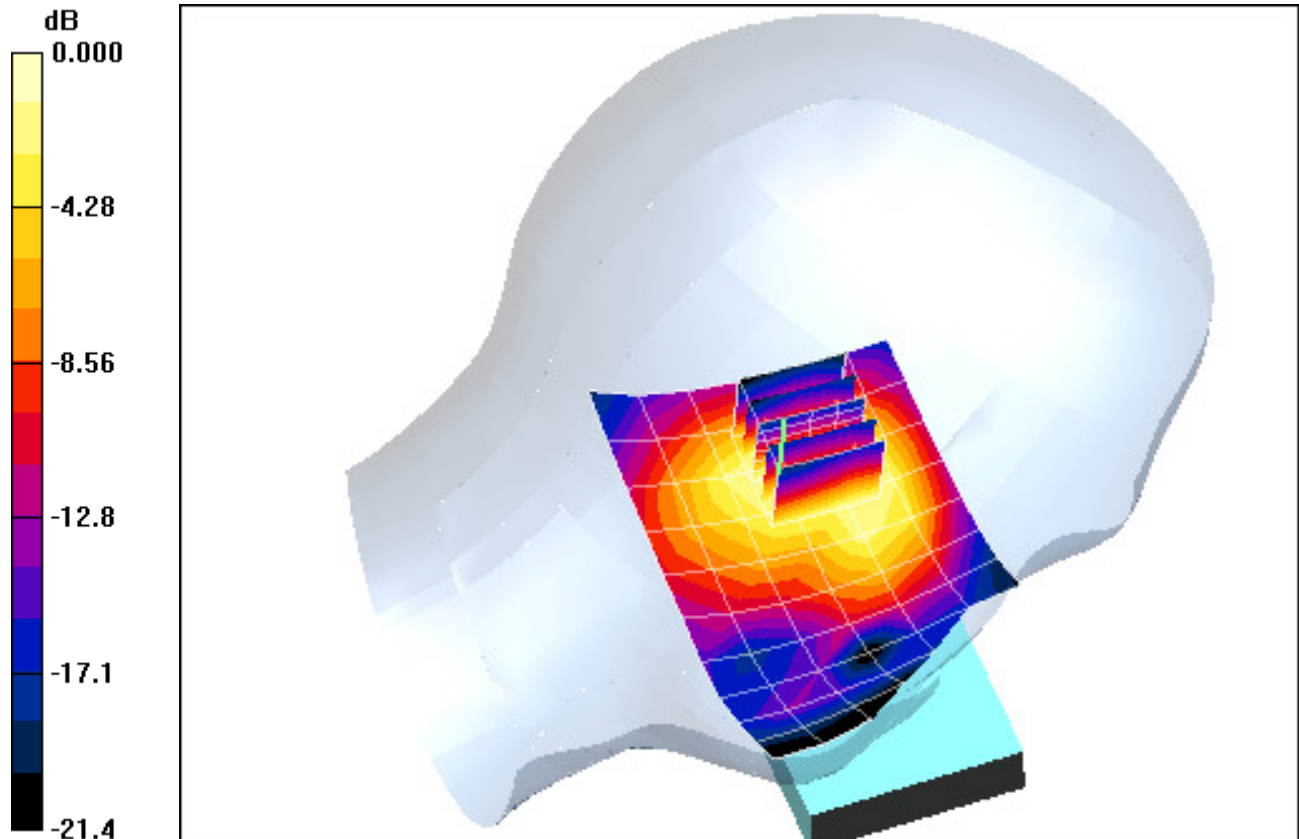
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.2 V/m; Power Drift = 0.054 dB

Peak SAR (extrapolated) = 0.621 W/kg

SAR(1 g) = 0.323 mW/g; SAR(10 g) = 0.174 mW/g



0 dB = 0.397mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: 2450 Brain Medium parameters used (interpolated):

$$f = 2412 \text{ MHz}; \sigma = 1.71 \text{ mho/m}; \epsilon_r = 38.4; \rho = 1000 \text{ kg/m}^3$$

Phantom section: Left Section

Test Date: 06-24-2010; Ambient Temp: 23.3 °C; Tissue Temp: 21.6 °C

Probe: ES3DV3 - SN3213; ConvF(4.36, 4.36, 4.36); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: IEEE 802.11b, Left Head, Touch, Ch 01, 1 Mbps

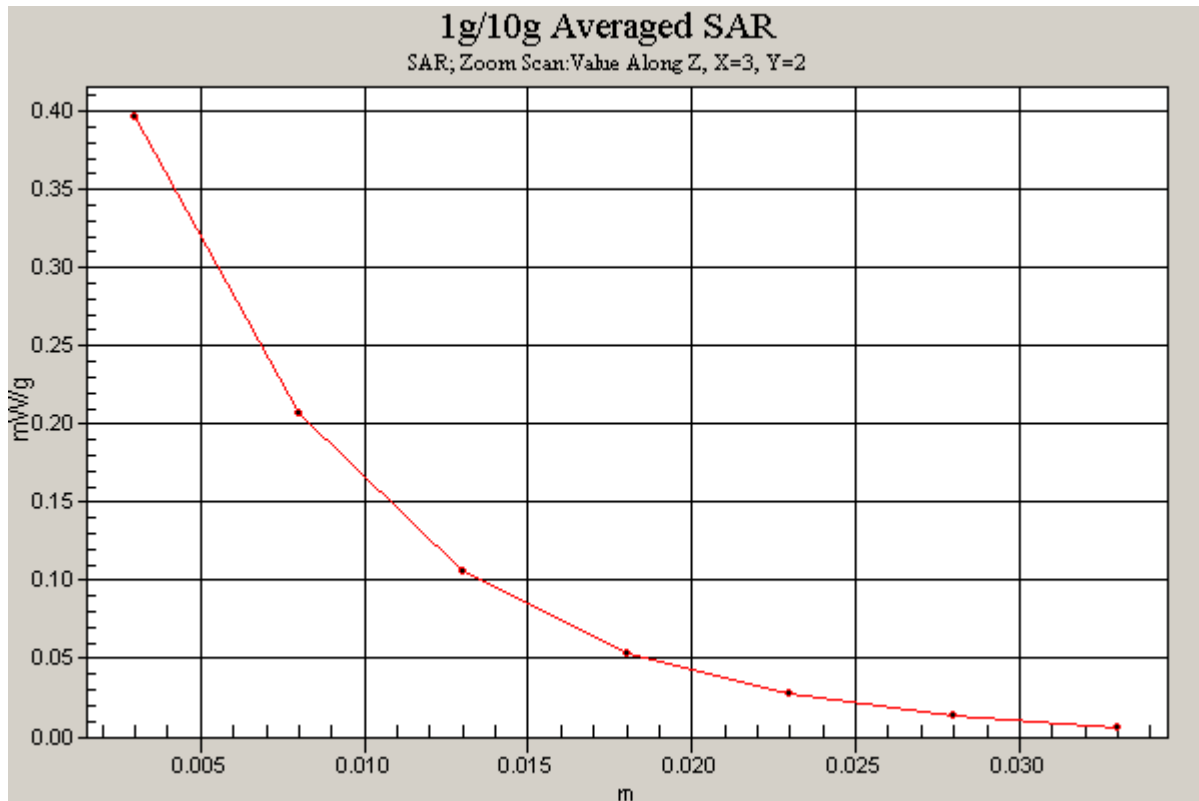
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.2 V/m; Power Drift = 0.054 dB

Peak SAR (extrapolated) = 0.621 W/kg

SAR(1 g) = 0.323 mW/g; SAR(10 g) = 0.174 mW/g



PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Brain Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$; $\sigma = 1.74 \text{ mho/m}$; $\epsilon_r = 38.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 06-16-2010; Ambient Temp: 22.7 °C; Tissue Temp: 21.5 °C

Probe: ES3DV3 - SN3213; ConvF(4.36, 4.36, 4.36); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: IEEE 802.11b, Left Head, Tilt, Ch 06, 1 Mbps

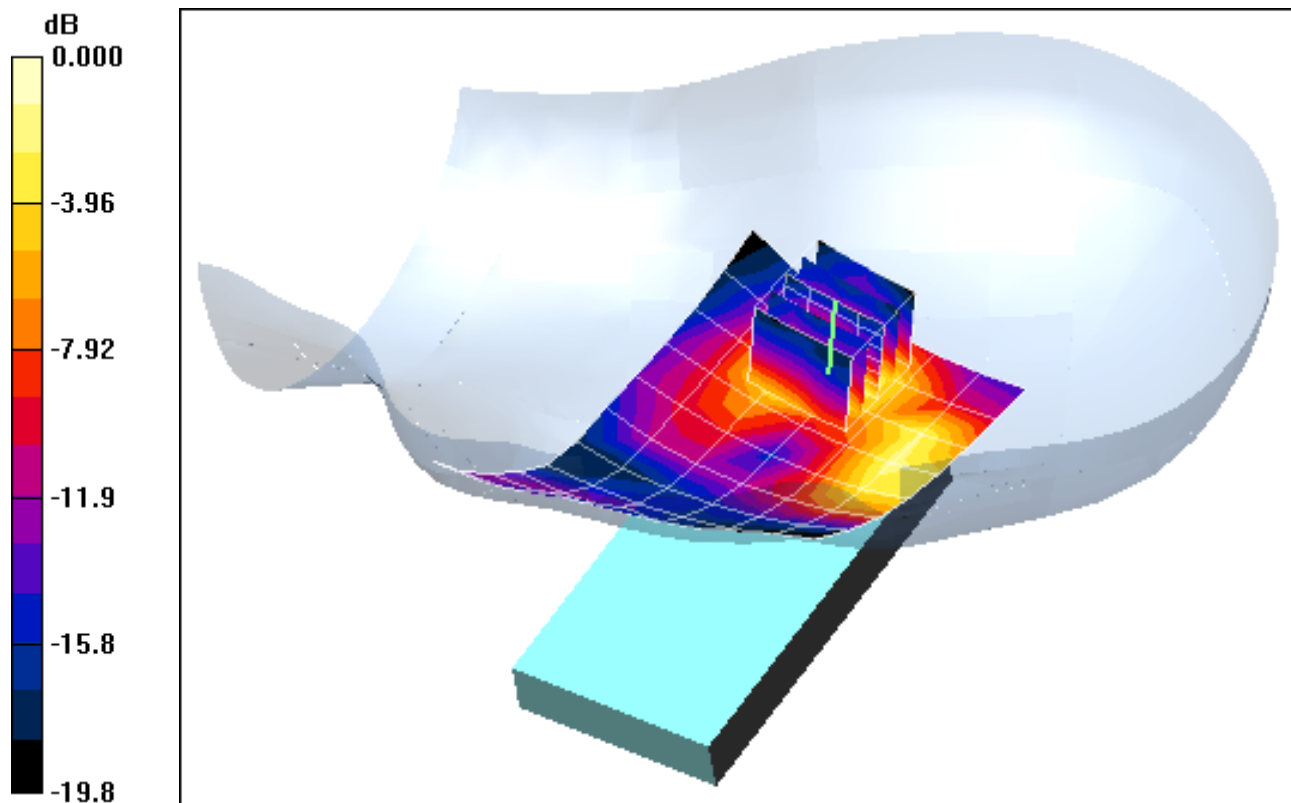
Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.02 V/m; Power Drift = -0.067 dB

Peak SAR (extrapolated) = 0.152 W/kg

SAR(1 g) = 0.074 mW/g; SAR(10 g) = 0.034 mW/g



0 dB = 0.095mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

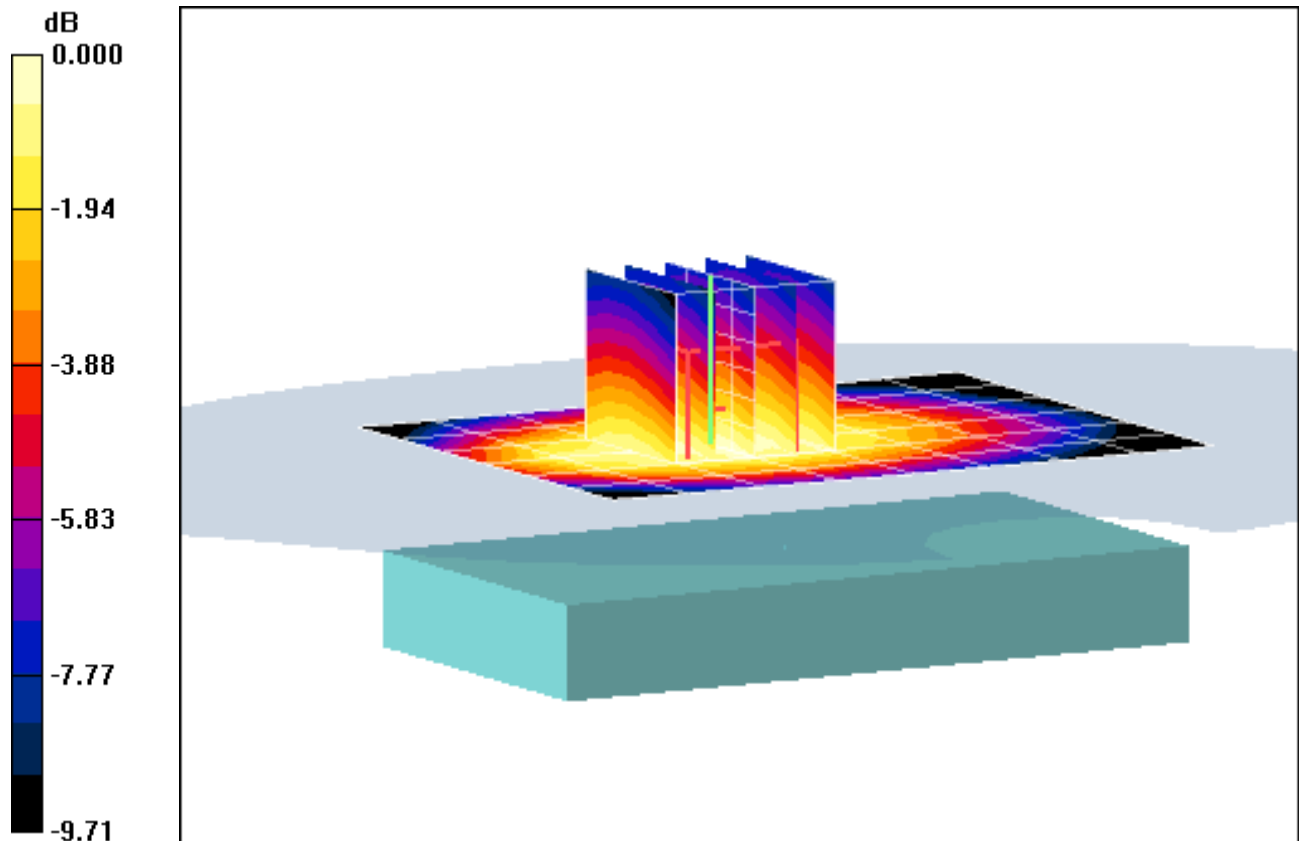
Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Muscle Medium parameters used (interpolated):
 $f = 836.52 \text{ MHz}$; $\sigma = 0.977 \text{ mho/m}$; $\epsilon_r = 53.4$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-21-2010; Ambient Temp: 22.5 °C; Tissue Temp: 20.9 °C

Probe: ES3DV3 - SN3213; ConvF(5.91, 5.91, 5.91); Calibrated: 3/16/2010
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn704; Calibrated: 3/22/2010
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: Cellular CDMA, Body SAR, Back side, Mid.ch, Standard Battery

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.2 V/m; Power Drift = -0.135 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.989 mW/g; SAR(10 g) = 0.723 mW/g



0 dB = 1.11mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

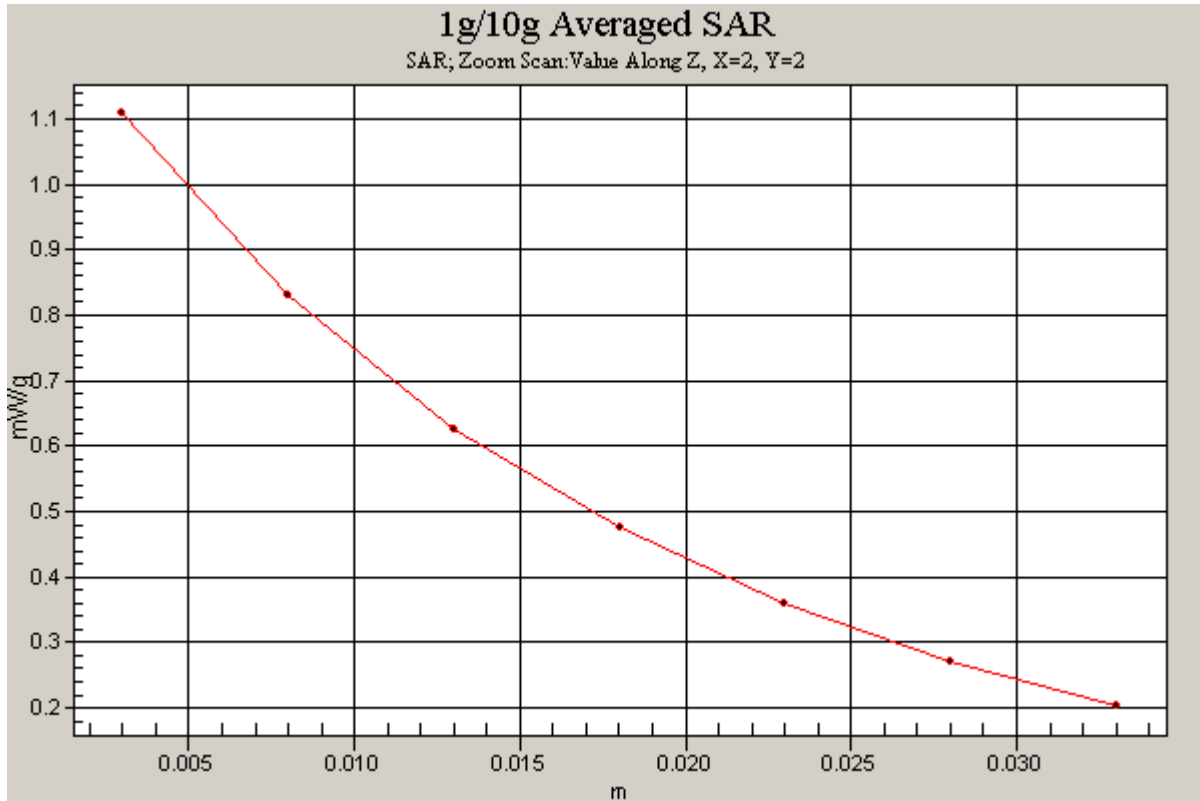
Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Muscle Medium parameters used (interpolated):
 $f = 836.52 \text{ MHz}$; $\sigma = 0.977 \text{ mho/m}$; $\epsilon_r = 53.4$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-21-2010; Ambient Temp: 22.5 °C; Tissue Temp: 20.9 °C

Probe: ES3DV3 - SN3213; ConvF(5.91, 5.91, 5.91); Calibrated: 3/16/2010
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn704; Calibrated: 3/22/2010
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: Cellular CDMA, Body SAR, Back side, Mid.ch, Standard Battery

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.2 V/m; Power Drift = -0.135 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.989 mW/g; SAR(10 g) = 0.723 mW/g



PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Muscle Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.54 \text{ mho/m}$; $\epsilon_r = 51.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-15-2010; Ambient Temp: 23.6 °C; Tissue Temp: 21.9 °C

Probe: ES3DV3 - SN3213; ConvF(4.61, 4.61, 4.61); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: PCS CDMA, Body SAR, Back side, Mid.ch, Standard Battery

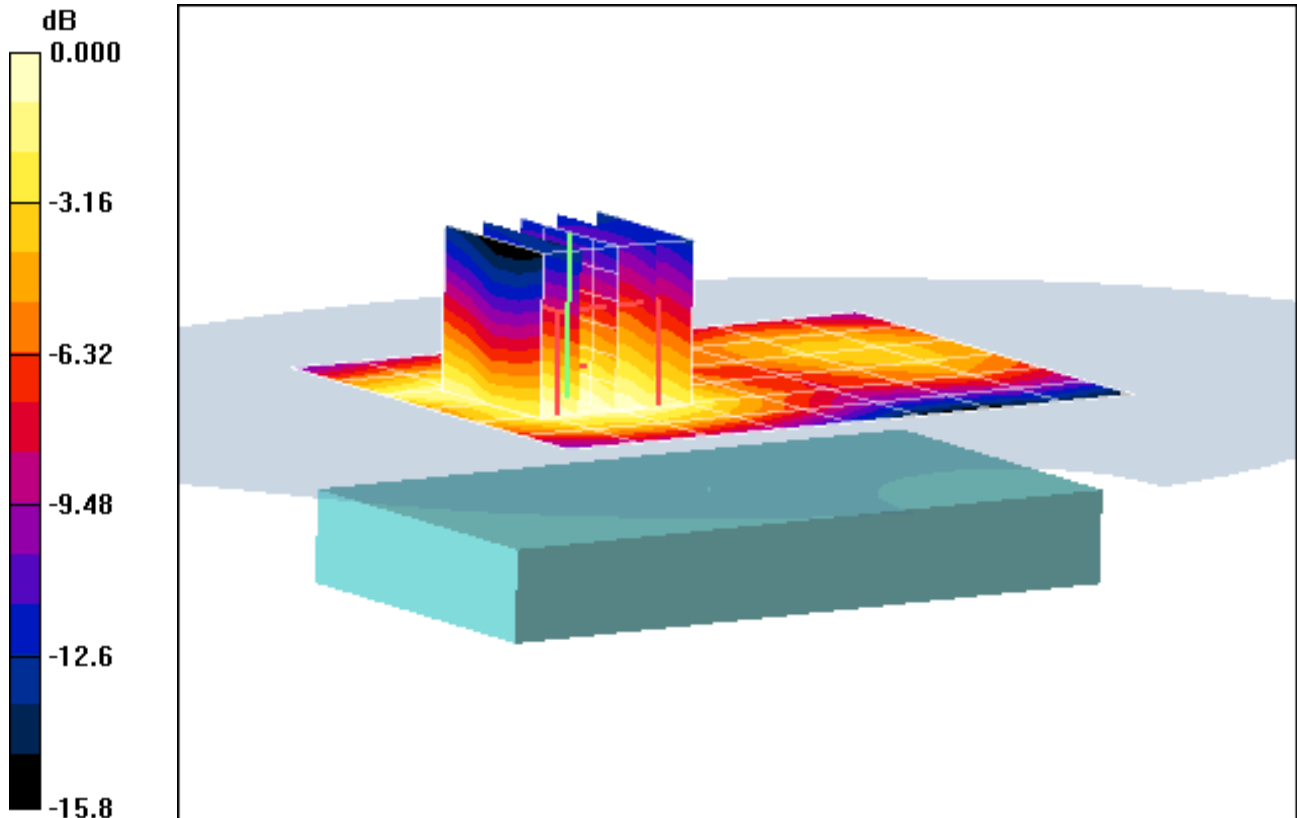
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 25.8 V/m; Power Drift = -0.256 dB

Peak SAR (extrapolated) = 1.20 W/kg

SAR(1 g) = 0.768 mW/g; SAR(10 g) = 0.476 mW/g



0 dB = 0.907mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Muscle Medium parameters used:

$$f = 1880 \text{ MHz}; \sigma = 1.54 \text{ mho/m}; \epsilon_r = 51.1; \rho = 1000 \text{ kg/m}^3$$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-15-2010; Ambient Temp: 23.6 °C; Tissue Temp: 21.9 °C

Probe: ES3DV3 - SN3213; ConvF(4.61, 4.61, 4.61); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: PCS CDMA, Body SAR, Back side, Mid.ch, Standard Battery

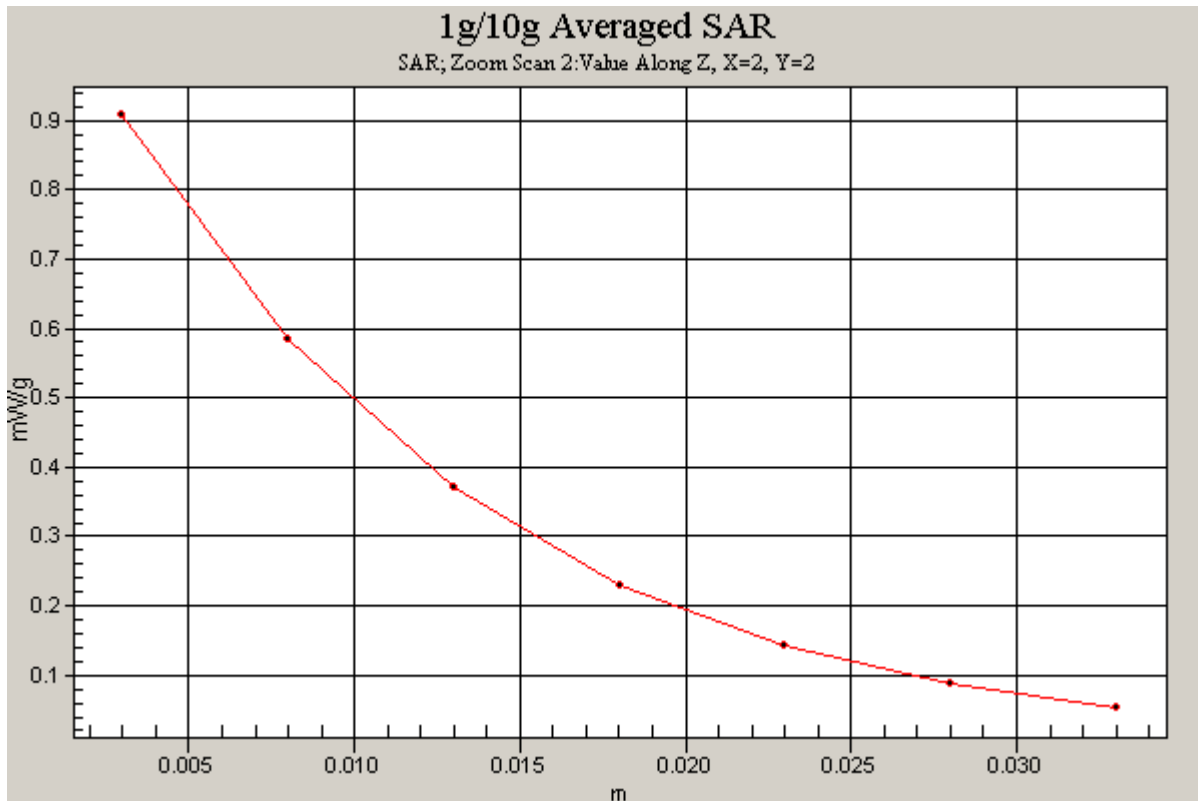
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 25.8 V/m; Power Drift = -0.256 dB

Peak SAR (extrapolated) = 1.20 W/kg

SAR(1 g) = 0.768 mW/g; SAR(10 g) = 0.476 mW/g



PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHD700; Type: Cell/PCS CDMA/EvDO Phone
with WiMAX, Bluetooth and WLAN; Serial: 76**

Communication System: WiMAX RF; Frequency: 2687.5 MHz; Duty Cycle: 1:2.7

Medium: 2600 Muscle Medium parameters used (interpolated):

$f = 2687.5 \text{ MHz}$; $\sigma = 2.24 \text{ mho/m}$; $\epsilon_r = 51$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-18-2010; Ambient Temp: 22.8 ° C; Tissue Temp: 22.0 °C

Probe: ES3DV3 - SN3173; ConvF(4.17, 4.17, 4.17); Calibrated: 2/10/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: WiMAX, Body SAR, Back Side, High Ch., BAMC2*3_QPSK1/2, 5MHz BW

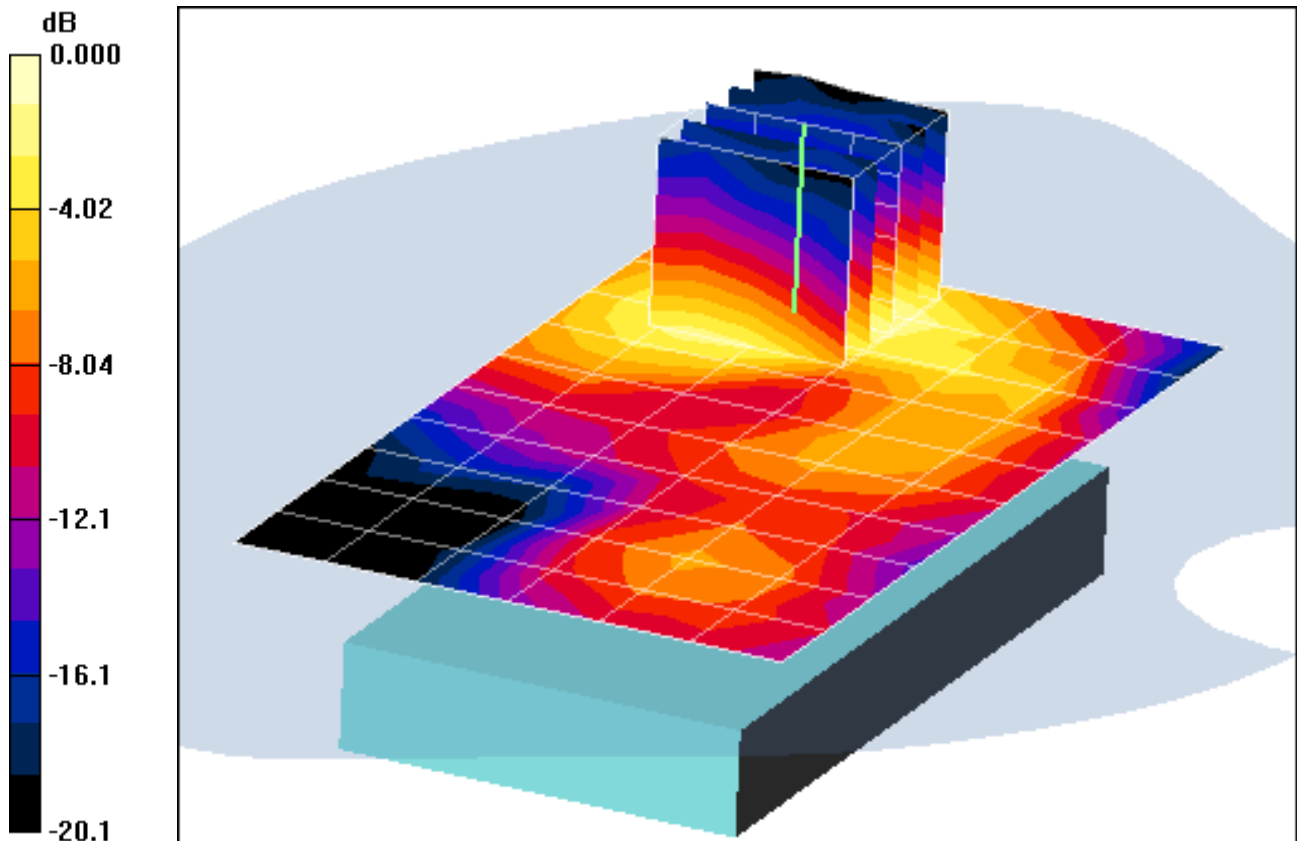
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.75 V/m; Power Drift = 0.053 dB

Peak SAR (extrapolated) = 0.348 W/kg

SAR(1 g) = 0.174 mW/g; SAR(10 g) = 0.092 mW/g



0 dB = 0.215mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSCHD700; Type: Cell/PCS CDMA/EvDO Phone
with WiMAX, Bluetooth and WLAN; Serial: 76**

Communication System: WiMAX RF; Frequency: 2687.5 MHz; Duty Cycle: 1:2.7

Medium: 2600 Muscle Medium parameters used (interpolated):

$$f = 2687.5 \text{ MHz}; \sigma = 2.24 \text{ mho/m}; \epsilon_r = 51; \rho = 1000 \text{ kg/m}^3$$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-18-2010; Ambient Temp: 22.8 ° C; Tissue Temp: 22.0 °C

Probe: ES3DV3 - SN3173; ConvF(4.17, 4.17, 4.17); Calibrated: 2/10/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: WiMAX, Body SAR, Back Side, High Ch., BAMC2*3_QPSK1/2, 5MHz BW

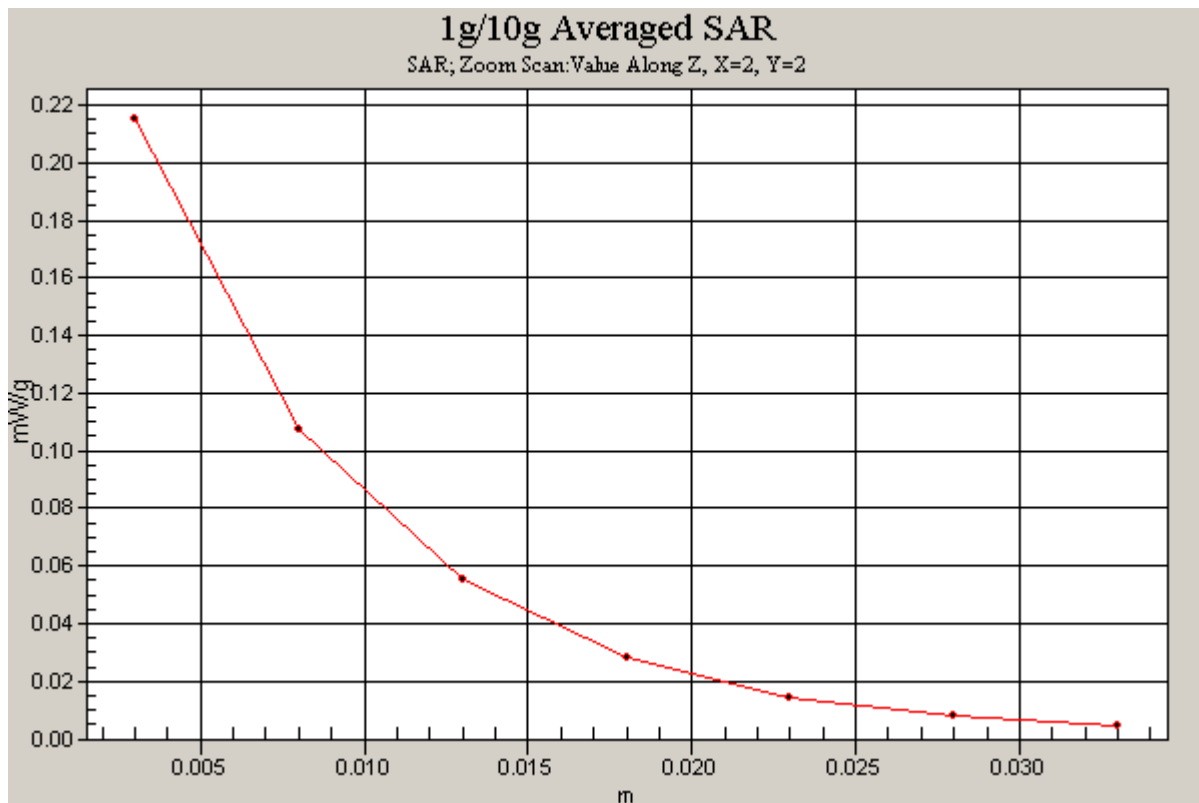
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.75 V/m; Power Drift = 0.053 dB

Peak SAR (extrapolated) = 0.348 W/kg

SAR(1 g) = 0.174 mW/g; SAR(10 g) = 0.092 mW/g



PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Muscle Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$; $\sigma = 1.93 \text{ mho/m}$; $\epsilon_r = 51$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-16-2010; Ambient Temp: 22.5 °C; Tissue Temp: 21.1 °C

Probe: ES3DV3 - SN3213; ConvF(4.27, 4.27, 4.27); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: IEEE 802.11b, Body SAR, Ch 06, 1 Mbps, Back Side

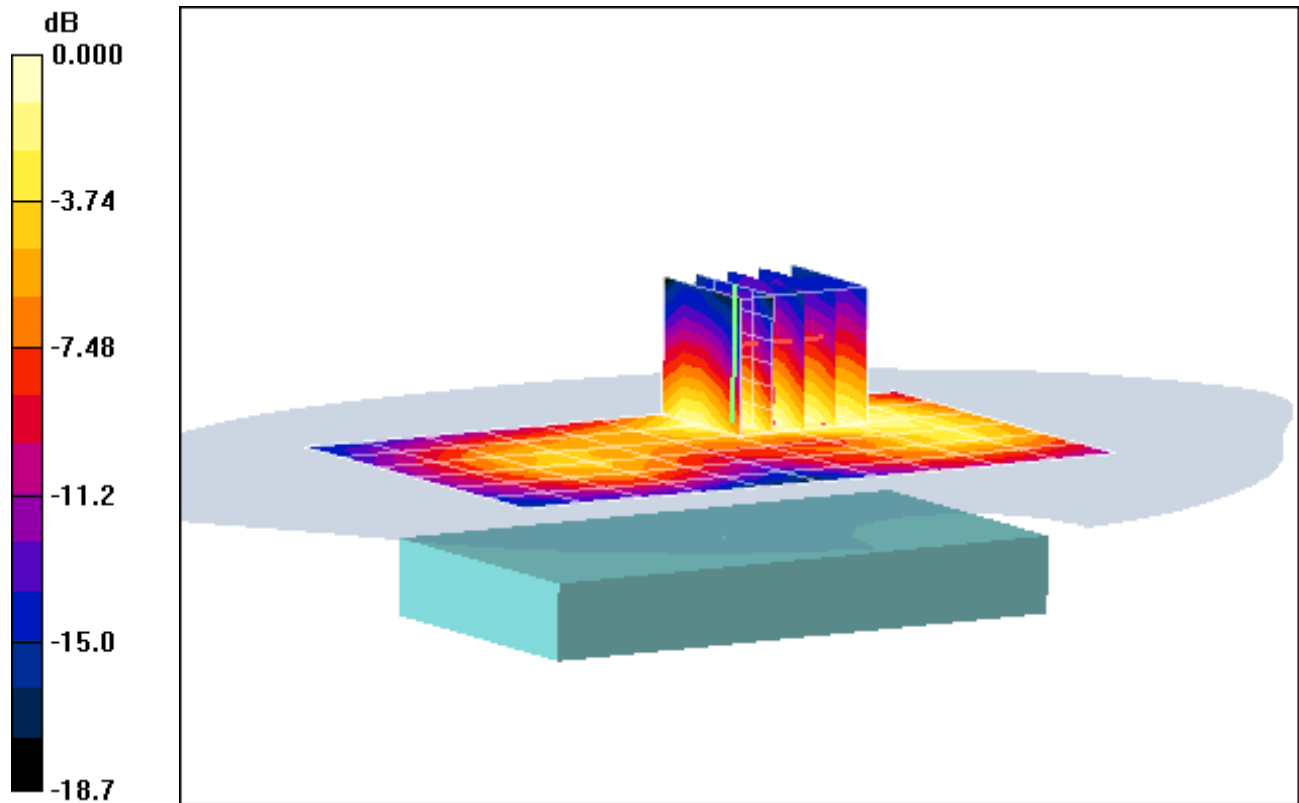
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.43 V/m; Power Drift = 0.006 dB

Peak SAR (extrapolated) = 0.164 W/kg

SAR(1 g) = 0.086 mW/g; SAR(10 g) = 0.047 mW/g



0 dB = 0.105mW/g

PCTEST ENGINEERING LABORATORY, INC.

**DUT: A3LSPHD700; Type: Cellular/PCS CDMA/EvDO Phone
with WIMAX, Bluetooth and WLAN; Serial: 76**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Muscle Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$; $\sigma = 1.93 \text{ mho/m}$; $\epsilon_r = 51$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-16-2010; Ambient Temp: 22.5 °C; Tissue Temp: 21.1 °C

Probe: ES3DV3 - SN3213; ConvF(4.27, 4.27, 4.27); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: IEEE 802.11b, Body SAR, Ch 06, 1Mbps, Back Side

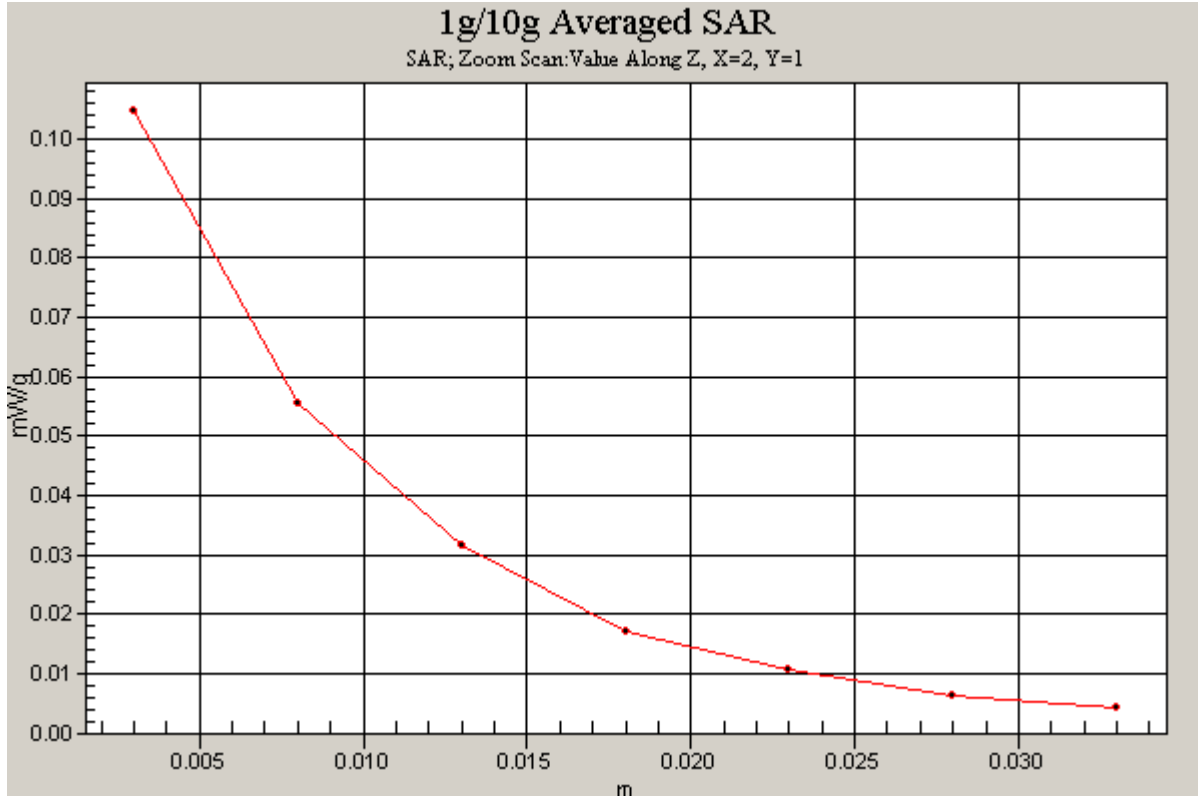
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.43 V/m; Power Drift = 0.006 dB

Peak SAR (extrapolated) = 0.164 W/kg

SAR(1 g) = 0.086 mW/g; SAR(10 g) = 0.047 mW/g



APPENDIX B: DIPOLE VALIDATION

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d047

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Brain Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.885 \text{ mho/m}$; $\epsilon_r = 41.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-15-2010; Ambient Temp: 22.6 °C; Tissue Temp: 21.5 °C

Probe: ES3DV3 - SN3213; ConvF(5.98, 5.98, 5.98); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

835MHz System Verification

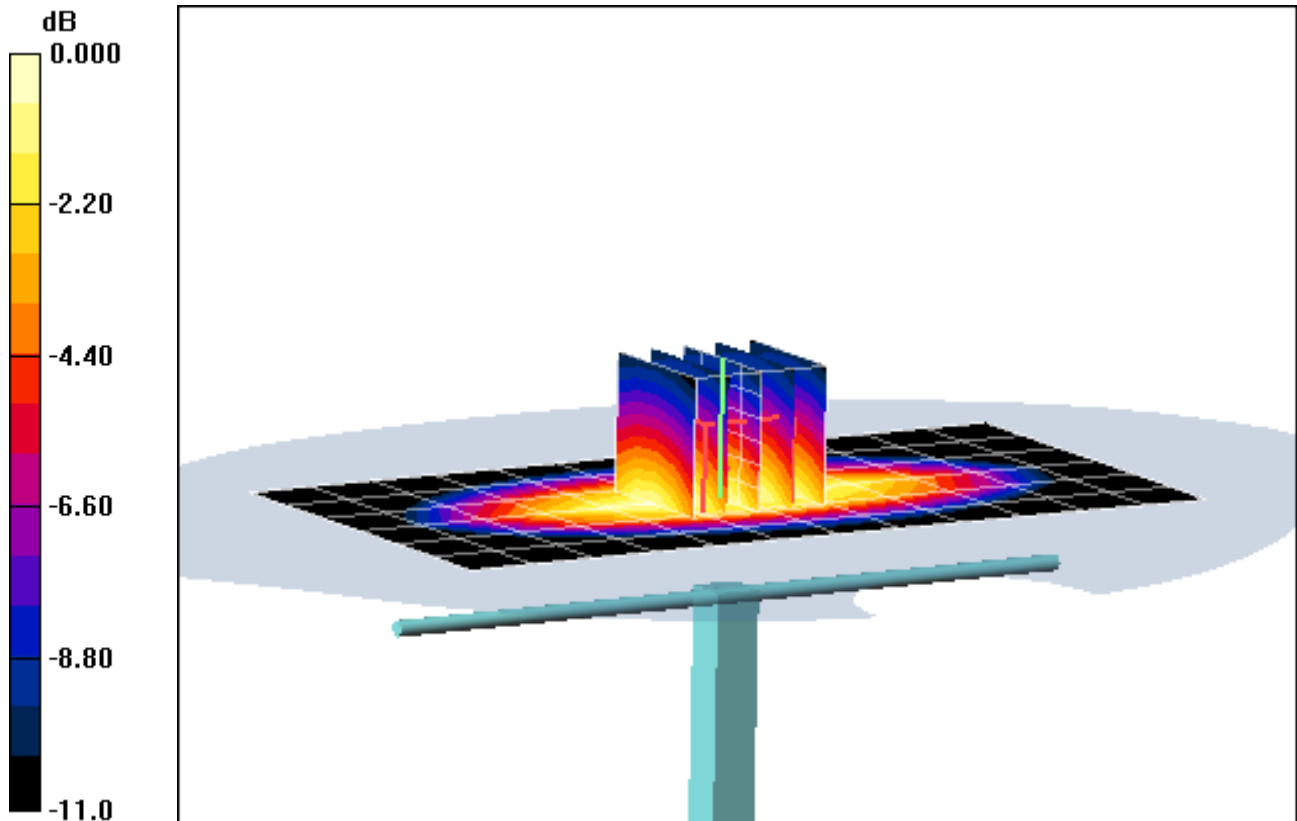
Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 18.0 dBm (63 mW)

SAR(1 g) = 0.651 mW/g; SAR(10 g) = 0.422 mW/g

Deviation = 6.53 %



0 dB = 0.761mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 502

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Brain Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.46 \text{ mho/m}$; $\epsilon_r = 40.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-15-2010; Ambient Temp: 23.5 °C; Tissue Temp: 21.8 °C

Probe: ES3DV3 - SN3213; ConvF(4.92, 4.92, 4.92); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

1900MHz System Verification

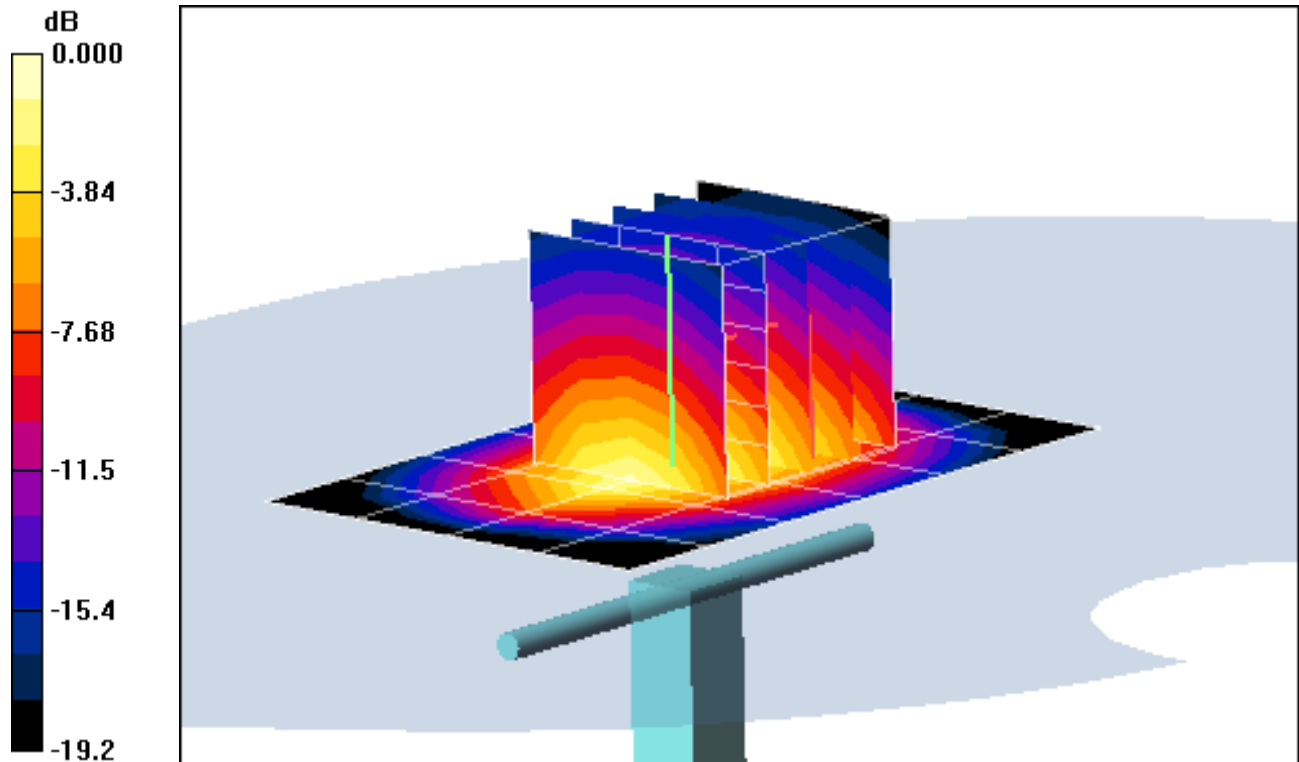
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 17.0 dBm (50 mW)

SAR(1 g) = 2.02 mW/g; SAR(10 g) = 1.04 mW/g

Deviation = 1.25 %



0 dB = 2.53mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 719

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Brain Medium parameters used:

$f = 2450 \text{ MHz}$; $s = 1.76 \text{ mho/m}$; $\epsilon_r = 38$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-16-2010; Ambient Temp: 22.7 °C; Tissue Temp: 21.5 °C

Probe: ES3DV3 - SN3213; ConvF(4.36, 4.36, 4.36); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

2450MHz System Verification

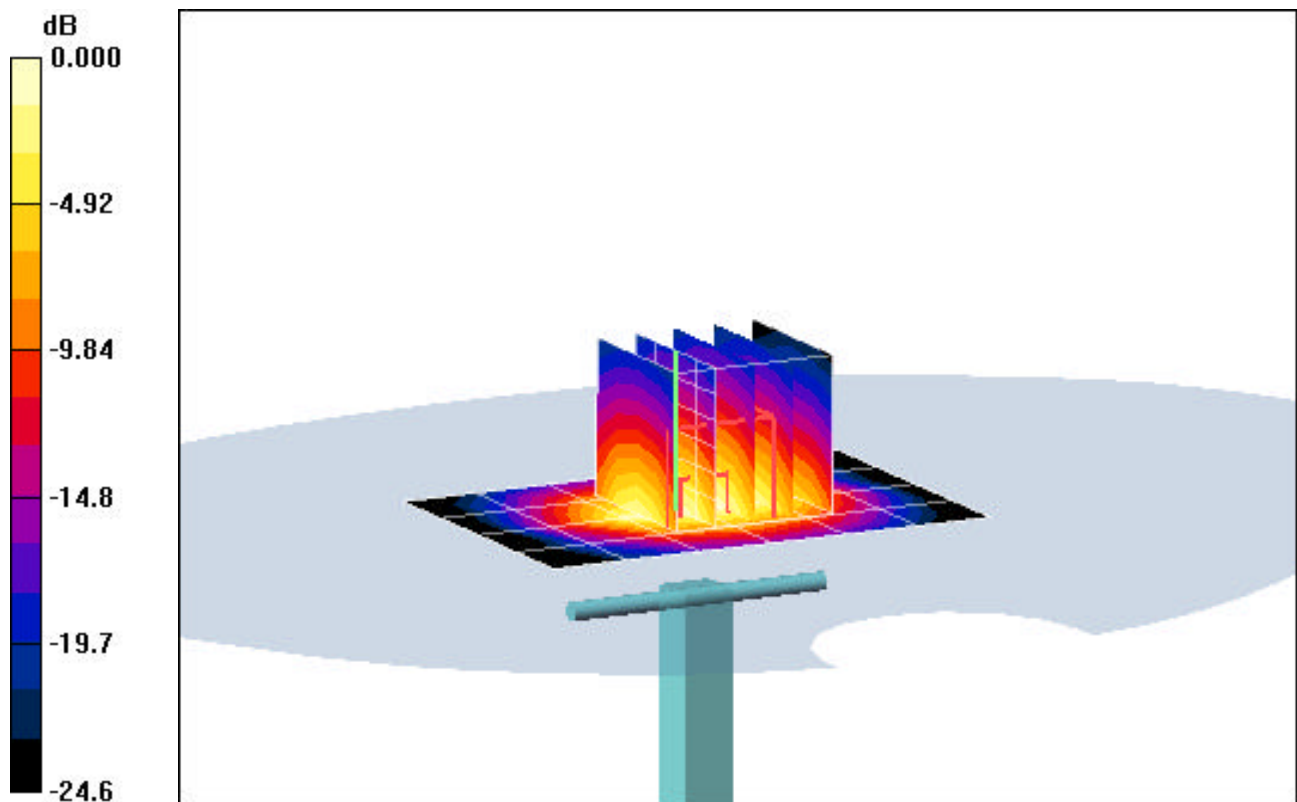
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 14.0 dBm (25 mW)

SAR(1 g) = 1.35 mW/g; SAR(10 g) = 0.618 mW/g

Deviation = 0.93 %



0 dB = 1.75mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 2600 MHz; Type: D2600V2; Serial: 1004

Communication System: CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: 2600 Muscle Medium parameters used:

$f = 2600 \text{ MHz}$; $\sigma = 2.13 \text{ mho/m}$; $\epsilon_r = 51.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-18-2010; Ambient Temp: 22.8 °C; Tissue Temp: 22.0 °C

Probe: ES3DV3 - SN3173; ConvF(4.17, 4.17, 4.17); Calibrated: 2/10/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

2600MHz System Verification

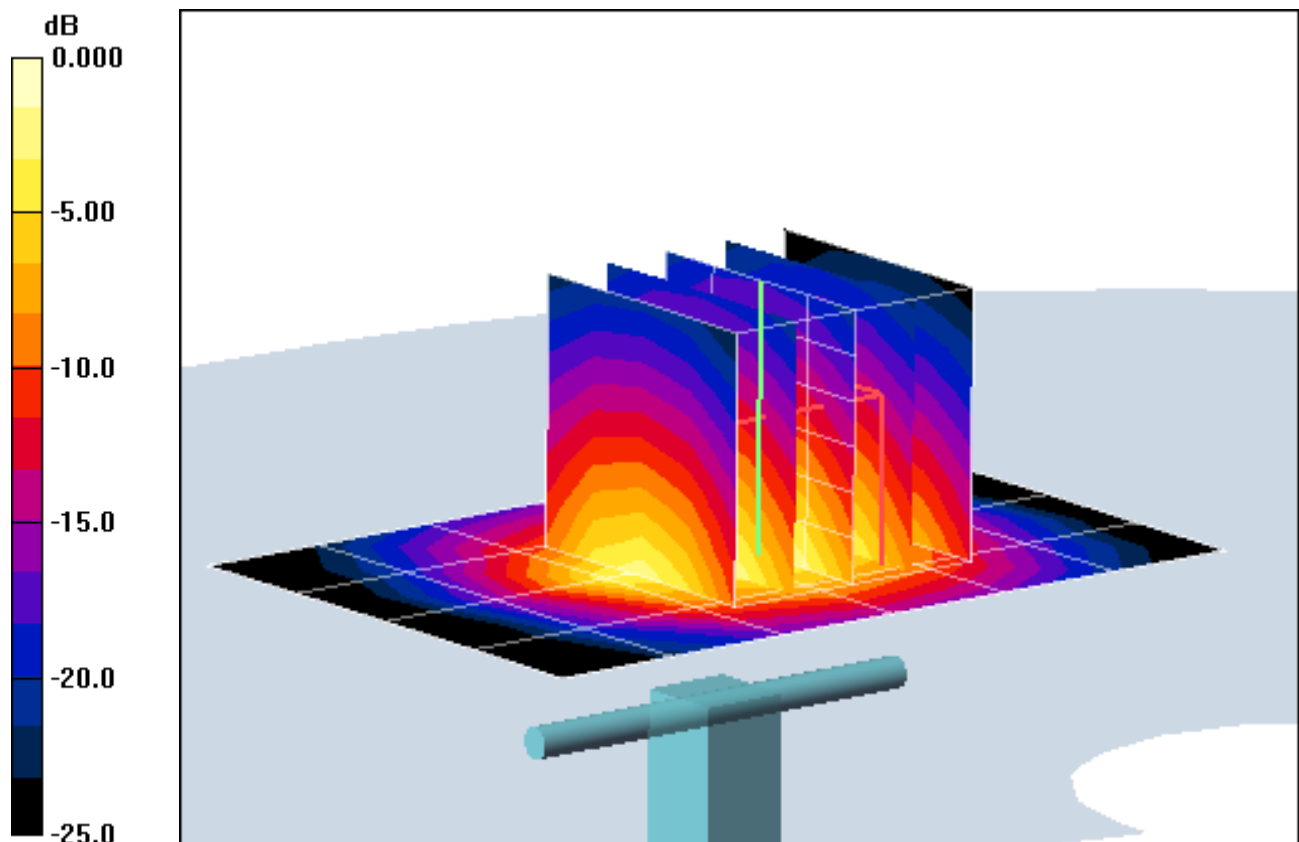
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 15.0 dBm (31.6 mW)

SAR(1 g) = 1.74 mW/g; SAR(10 g) = 0.762 mW/g

Deviation = -0.97 %



0 dB = 2.28mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d047

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Muscle Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.976 \text{ mho/m}$; $\epsilon_r = 53.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-21-2010; Ambient Temp: 22.5 °C; Tissue Temp: 20.9 °C

Probe: ES3DV3 - SN3213; ConvF(5.91, 5.91, 5.91); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

835MHz System Verification

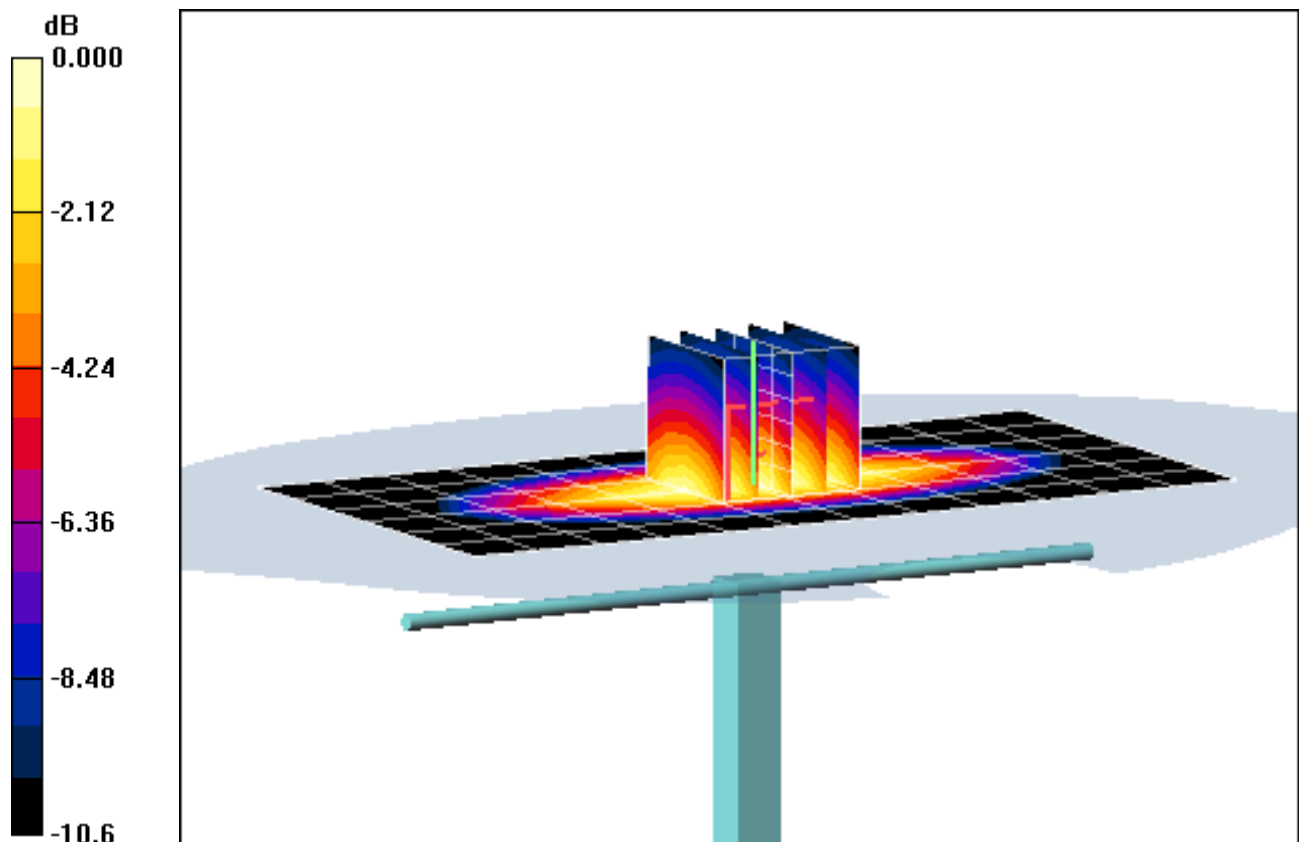
Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Input Power = 18.1 dBm (64.6 mW)

SAR(1 g) = 0.691 mW/g; SAR(10 g) = 0.450 mW/g

Deviation = 8.93 %



0 dB = 0.809mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 719

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Brain Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.74 \text{ mho/m}$; $\epsilon_r = 38.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-24-2010; Ambient Temp: 23.3 °C; Tissue Temp: 21.6 °C

Probe: ES3DV3 - SN3213; ConvF(4.36, 4.36, 4.36); Calibrated: 3/16/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/22/2010

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

2450MHz System Verification

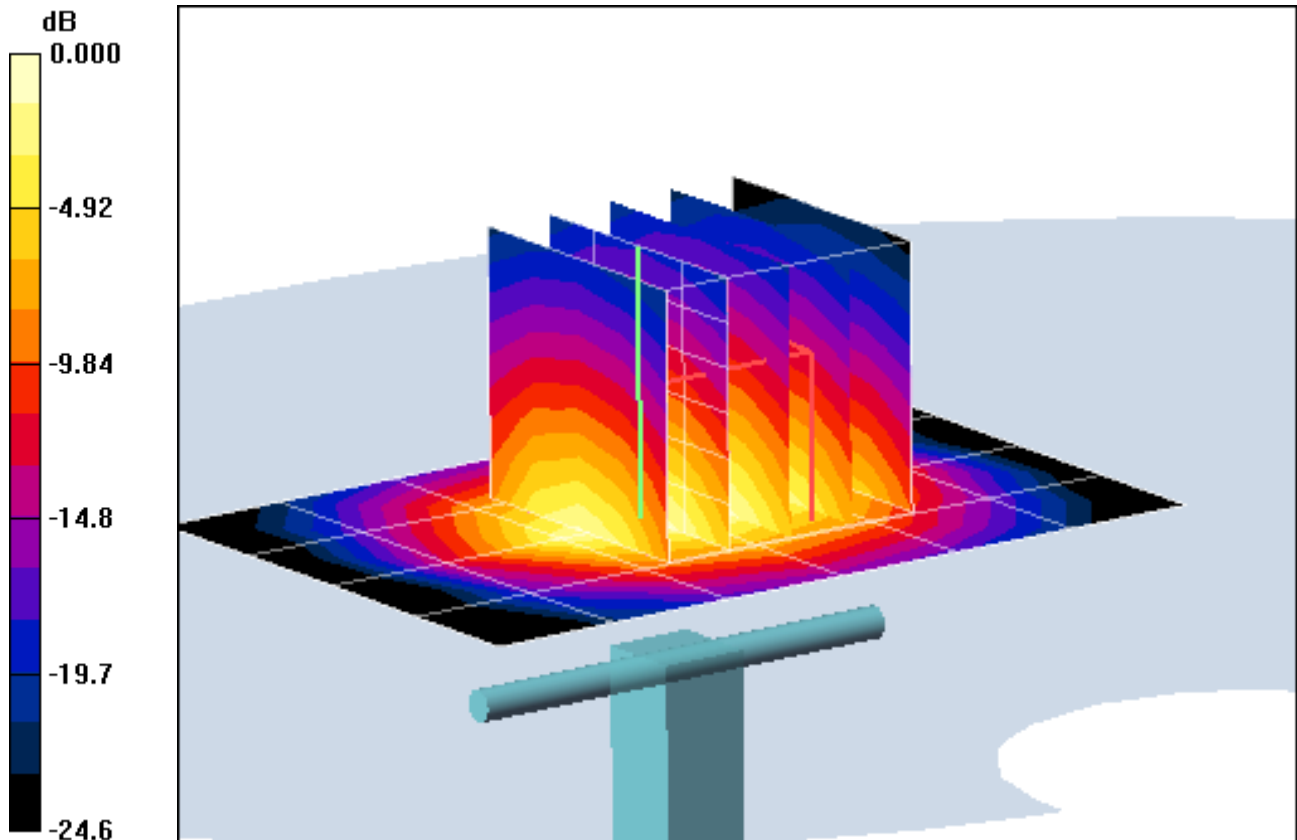
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 14.0 dBm (25 mW)

SAR(1 g) = 1.33 mW/g; SAR(10 g) = 0.611 mW/g

Deviation = -0.56 %



0 dB = 1.73mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 2600 MHz; Type: D2600V2; Serial: 1004

Communication System: CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: 2600 Brain Medium parameters used:

$f = 2600 \text{ MHz}$; $\sigma = 2.01 \text{ mho/m}$; $\epsilon_r = 39$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-19-2010; Ambient Temp: 24.7 °C; Tissue Temp: 22.9 °C

Probe: ES3DV3 - SN3173; ConvF(4.31, 4.31, 4.31); Calibrated: 2/10/2010

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/21/2010

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

2600MHz System Verification

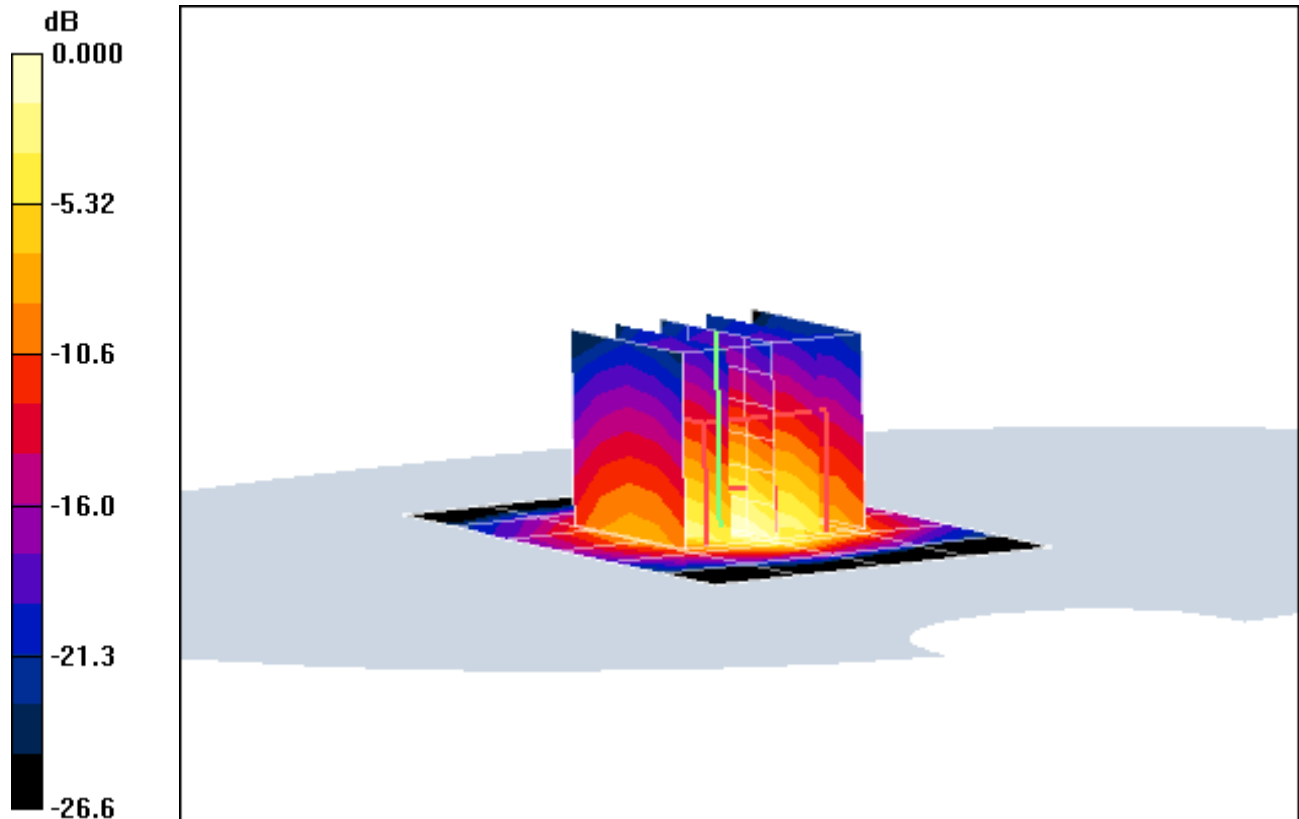
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power = 10.0 dBm (10 mW)

SAR(1 g) = 0.540 mW/g; SAR(10 g) = 0.242 mW/g

Deviation = -4.59 %



0 dB = 0.715mW/g